The University of Montana

Department of Mathematical Sciences

CAS · THE COLLEGE OF ARTS & SCIENCES

A Newsletter for Alumni, Faculty, Staff, and Friends Fall 2006

Elevator Renovation: Some Highlights

by Mark Kayll

In the two most recent Newsletter issues (Fall 2005, Summer 2006), department Chair David Patterson mentioned the renovation to add an elevator and convert the Mathematics Building into fully accessible space. Now that construction is proceeding full-swing, readers might be interested to hear some of the details.

Aside from the financial hurdles that needed to be cleared, this project also had to overcome considerable architectural and bureaucratic constraints. Those who've spent time in the building will recall that it's listed in the National Register of Historic Places. Consequently, exterior renovations require state clearance through the Montana Historical Society.

Planning. The project's architect, Mike Gilbert of Missoula's Gilbert Architecture, showed incredible patience through the planning stage. Meetings typically consisted of eight-ten people—representing constituencies such as UM's Planning & Construction office, the Missoula Office of Planning & Grants, the state Architecture & Engineering office, UM's Disability Services office (the list could go on)—all voicing individual preferences and suggesting plan revisions. Having to endure all the pushing and pulling would have made some people throw up their hands and give up. Mike listened carefully and by the next meeting was ready to present drawings incorporating the new ideas. Then he'd be asked to do it again. And again...

Elevator Structure: East Elevation

(continued on page 4—"Elevator Renovation")

NSF Award to Initiate a New Interdisciplinary Ph.D. Program

by Jon Graham

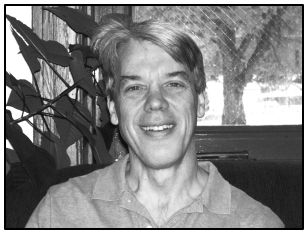
As far back as 2002, Mary Poss in the Division of Biological Sciences initiated conversations with members of the math department about the development of an interdisciplinary program in mathematics and biology. These conversations grew into a grant proposal to the National Science Foundation (NSF) eventually combining members from the biological sciences, computational sciences, and mathematical sciences. After two unsuccessful attempts, the University of Montana was awarded a 5-year NSF Interdisciplinary Graduate Education and Research Traineeship (IGERT) grant in the amount of $3.2 million in September of 2005 to develop a Ph.D. program providing an interdisciplinary training in the ecology of infectious diseases. This program seeks to train participants in the mathematical, biological, and computational aspects of infectious disease systems, to the extent that graduates from this program are proficient in all of these realms.

The first group of eight graduate trainees entered the "Montana Ecology of Infectious Disease" (M-EID) program in the fall of 2006 and have been jointly taking a set of IGERT core courses. These courses include a mathematical modeling practicum attempting to interweave dynamical and statistical aspects of modeling disease systems, a virology course to provide background on the basic biology of infectious diseases, and a communications across the sciences course to study communication strategies and issues when talking to researchers in multiple fields. In the spring semester, M-EID trainees will take a second practicum where students will form groups to model a selected disease system, continue the communications course, and invite several recognized researchers to deliver a series of seminar talks at the University of Montana. There is a strong commitment to team-based learning in this program as students bring diverse backgrounds and skills with a general interest in infectious diseases.

Some other components of the M-EID program making it unique as a Ph.D. program include an internship requirement, a dissertation co-mentored by faculty from more than one field, one chapter of the dissertation co-authored with another M-EID student, and a teaching

(Continued on page 5 - "NSF Award")

Notes from the Chair



It has been a busy and noisy fall around the Math Building as the elevator construction is in full swing (see Mark Kayll's article on page 1 for details). A few other changes have taken place around the department also. We reorganized some of the administrative duties to create two new Associate Chair positions. Nikolaus Vonessen is Associate Chair for Undergraduate Studies where he serves as Chair of the Undergraduate Committee, faculty advisor to the Math Club and editor of the newsletter, among other duties. Jenny McNulty is Associate Chair for Graduate Studies where she serves as Chair of the Graduate Committee, and handles most of the issues associated with the graduate program. I am very grateful that Nikolaus and Jenny agreed to take on these duties and also thank Mark Kayll for his four years of service as Associate Chair under the old system.

One of the best parts of this job is the opportunity to meet students: prospective, current, and, especially, past. I was pleasantly surprised last July when two former graduate students, Mike Lundin and Lynn Turnquist, unexpectedly stopped by my office. Mike and Lynn were graduate students in my early days on the faculty here in the 1980's. I got to go on a short hike with them in the Rattlesnake the next morning before they left town. It was great to talk to them and see how successful they've been (see Alumni Notes). I look forward to meeting any other former students who want to stop by!

David A. Patterson

Nyman Receives Cox Award

by Mark Kayll

In April, UM's College of Arts and Sciences (CAS) announced that Assistant Professor Adam Nyman had been selected as a recipient of the *2006 Helen and Winston Cox Educational Excellence Award*. This honor is bestowed annually to one or two tenure-track faculty members who are as yet untenured. Awardees are selected on the basis of superior teaching, student advising and mentoring, accessibility to students beyond normal office hours, scholarly/professional activity, and campus/community service, with the primary emphasis on excellence in teaching. The award includes a cash prize, $750 of which is given to UM's Mansfield Library for the recipient to purchase research materials.

The nomination letter opened: "Adam Nyman's commitment to quality teaching manifests itself in a striking number of ways. From classroom performance to one-on-one office instruction, and from mentoring inexperienced undergraduates to advising graduate students completing dissertations, Dr. Nyman embodies the ideals the ... Award seeks to recognize." When one considers what students had to say about Professor Nyman, it is easy to see why he was nominated: "He is the most approachable professor I have ever had..."; "I find Adam to be a highly professional, caring teacher, a fantastic advisor and a good friend."; "My work with Professor Nyman on this project was the most rewarding of all my experiences at the University of Montana." Formal recognition from students came early for Dr. Nyman. Perhaps presciently, in both 2003 and 2004, his first two years at UM, he was invited to the Ninth and Tenth Annual Student Honors Society faculty appreciation receptions.

This year's Cox Award competition was exceptionally tough. Classics Professor James Scott, CAS Associate Dean, and Chair of the selection committee, wrote, "every year I sincerely say the following, but this year I feel more strongly than ever before: The field of nominations was especially and closely excellent. Distinguishing the winners was difficult."

And just to close his banner year, Dr. Nyman was promoted to Associate Professor, effective Autumn 2006.

Hats off to Professor Nyman for a well-deserved award (and promotion)!

Prof. Nyman is spending the 2006-07 academic year on a faculty exchange at Fudan University in Shanghai, China.

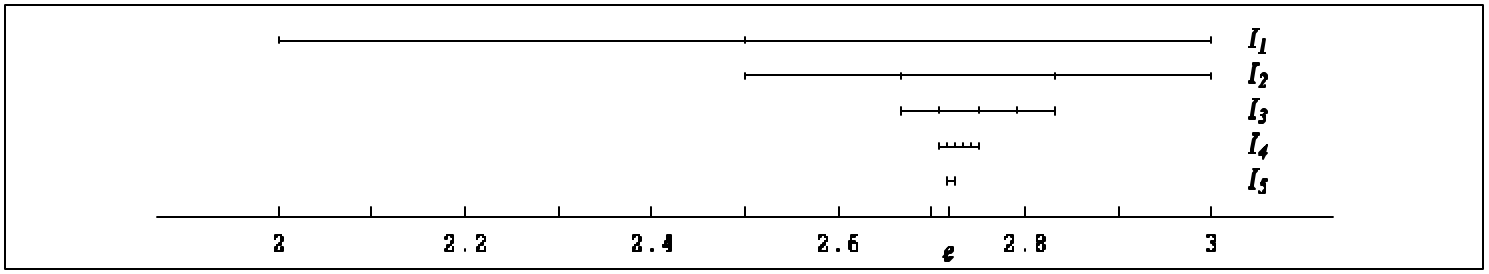
Faculty:

David Patterson, *Chair*
Jenny McNulty, *Assoc. Chair-Graduate Program*
Nikolaus Vonessen, *Assoc. Chair-Undergraduate Program & Newsletter Editor*

John Bardsley, *Applied Mathematics*
Rick Billstein, *Mathematics Education*
Lauren Fern, *Lecturer*
Jon Graham, *Statistics*
Jennifer Halfpap, *Analysis*
Solomon Harrar, *Statistics*
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, *Education*
Brian Steele, *Statistics*
Emily Stone, *Applied Mathematics*
Karel Stroethoff, *Analysis*
Thomas Tonev, *Analysis*
Carol Ulsafer, *Lecturer*
Nikolaus Vonessen, *Algebra*

Faculty Emeriti:

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



A Graphical Description of the Euler Number *e*

by Nikolaus Vonessen

In a recent paper in the *American Mathematical Monthly* (August-September 2006, pp. 637-641), Jonathan Sondow described a new graphical algorithm on how to find the famous Euler number $e \approx 2.71828$, and also showed how one can, using this algorithm, give a graphical proof that *e* is an irrational number. I found this so neat that I wanted to present his arguments to you. They are fairly elementary; the most advanced fact we use is that *e* can be written as the infinite series (infinite sum)

$$e = 1 + 1 + \frac{1}{2!} + \frac{1}{3!} + \frac{1}{4!} + \ldots,$$

a well-known fact from first-year calculus. And everything revolves around the figure displayed above, which illustrates Sondow's algorithm:

> The Euler number *e* is the one and only real number lying in all intervals $I_1, I_2, I_3, \ldots$, where these intervals are recursively constructed as follows. The first interval is $I_1 = [2, 3]$. Suppose that I_n has already been constructed. Divide I_n into $n+1$ closed subintervals of equal length; then I_{n+1} is the *second* of these subintervals.

The figure above shows the first five of these intervals, I_1 through I_5. It may help to construct a few of these intervals in a concrete manner. As stated, I_1 is the closed interval from 2 to 3, i.e., $I_1 = [2, 3]$. We then divide the interval I_1 into two equal subintervals, and let I_2 be the second of these. That is $I_2 = [2.5, 3] = \left[\frac{5}{2}, \frac{6}{2}\right]$. To determine the third interval, I_3, we divide the preceding interval (namely I_2) into three equal subintervals, and let I_3 be the second of these. You can check that $I_3 = \left[\frac{16}{6}, \frac{17}{6}\right]$.

It is clear from the construction (and the figure) that I_1 contains I_2, that I_2 contains I_3, that I_3 contains I_4, and so on. This means that we have a "nested sequence of closed intervals."

The figure also indicates that the intervals get quite rapidly rather small. How small? Well, the length of I_1 is 1, and the length of I_2 is $\frac{1}{2}$. To construct I_3, we divided the interval I_2 (of length $\frac{1}{2}$) into 3 equal parts, so the length of I_3 is $\left(\frac{1}{2}\right)/3 = \frac{1}{3!}$. Similarly, the length of I_4 is $\left(\frac{1}{3!}\right)/4 = \frac{1}{4!}$. And in general, the length of the *n*-th interval I_n is $\frac{1}{n!}$.

So the intervals $I_1, I_2, I_3, \ldots$ form a nested sequence of intervals whose lengths get shorter and shorter, and in fact approach zero. Hence there is one and only one real number which is contained in all the intervals I_n. Let's call that number *b*. We will now prove that this number *b* is nothing but the Euler number *e*.

For this, we compute for each interval I_n its left endpoint, which we will call L_n. The left endpoint of I_1 is $L_1 = 2 = 1 + 1$, and the left endpoint of I_2 is $L_2 = 2.5 = 1 + 1 + \frac{1}{2}$. To construct I_3, we divided I_2 (which has length $\frac{1}{2}$) into 3 equal subintervals (each of length $\frac{1}{3!}$) and chose the second of the subintervals. So the left endpoint of I_3 is the left endpoint of I_2 plus $\frac{1}{3!}$, i.e.,

$$L_3 = 1 + 1 + \frac{1}{2!} + \frac{1}{3!}.$$

This starts to look very familiar! Arguing similarly, we see that I_4 has left endpoint

$$L_4 = 1 + 1 + \frac{1}{2!} + \frac{1}{3!} + \frac{1}{4!}.$$

In general, the interval I_n has left endpoint

$$L_n = 1 + 1 + \frac{1}{2!} + \frac{1}{3!} + \frac{1}{4!} + \cdots + \frac{1}{n!}. \qquad (*)$$

(If one wants to be rigorous, one can prove this last formula by induction.) Since *b* belongs to every interval I_n, and since L_n is the left endpoint of the interval I_n, we see that $L_n \le b$ for all *n*. Since *b* is the only real number which belongs to *all* intervals I_n, *b* must be the smallest real number $\ge L_n$ for all *n*. The latter is nothing but the limit of the increasing sequence $L_1, L_2, L_3 \ldots$. And this limit is, after all,

$$e = 1 + 1 + \frac{1}{2!} + \frac{1}{3!} + \frac{1}{4!} \cdots.$$

Thus $b = e$, and the Euler number *e* is the one and only real number contained in all intervals I_n.

(continued on page 6 - "Euler Number e")

("Elevator Renovation" - continued from page 1)

At the end of the planning, the elegant solution Mike proposed satisfied everybody. The new structure will sit separate from and directly South of the main building and be joined by glassed-in walkways on each floor. Approaching from the South or East, visitors will be welcomed by Doric columns supporting a covered entryway. (What better way to dress up a building devoted to mathematics than to remind us of the Greeks?) People will be able to enter the new building close to the old South entrance, which will be incorporated into a lobby. This renovated entrance will be accessible to everyone, since the lobby services both the back stairway and the elevator. A disabled person will no longer have to use the ramp to the basement utility corridor.

The elevator's ground-level door opens North-South, while its doors to the interior open East-West. The architect's East Elevation (page 1) depicts the entryway and shows how successfully he reflected the old building's style in the new. The numbers 1, 2, 3 mark the floor levels on each story, and if one looks closely, she can discern the old roof line and new glass walkways.

Project Phases. The project planners divided the work into two phases. Phase I set out to prepare the old building for the addition. On each floor, a North-South hallway needed to be created, eventually to join with the glassed-in walkways. This meant losing one office on each level, but the new structure will contain more new offices than we lost: two per floor, for a net gain of four offices.

Perhaps the most dramatic event during Phase I was cutting holes into the South side of the building for access to these hallways. While the huge concrete saw knifed through the old orange brick like butter, the granite blocks decorating the old windows presented quite a different challenge.

The photo below shows what used to be two second-floor offices; remember those pairs of miniature offices on the second and third floors, accessible from a doorway within a doorway? On both floors, those offices were gutted to make way for the new hallways, as new, larger offices were created to the right of the hallways. The photo shows the framing for the hallway wall, with the doorway into the new office clearly visible.

Phase I: Conversion of two 2nd floor offices

Phase II comprises the project's main segment, namely excavating and building the new structure. It began dramatically enough just after Labor Day, when a back-hoe started digging access for a new sewer. After a few weeks of moving dirt around—repeatedly redigging and refilling the same few holes, or so it seemed—visual progress grew exponentially.

Phase II: Back hoe in action, taken from the South exit

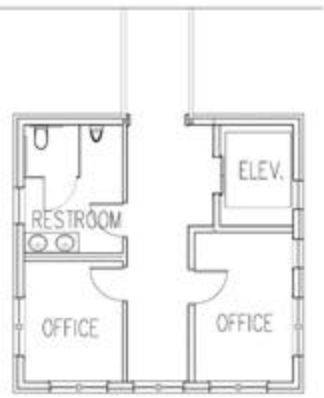
Before long, the concrete footing was poured, followed by twelve-foot concrete walls for the basement and first floor. Next on the schedule is steel framing, followed closely by masonry. As the brickwork begins, the project forks into several parallel tasks, including the electrical and mechanical rough-ins and the interior finish. Judging from the current schedule—a clear candidate for a CPM (Critical Path Method) analysis—Phase II should be finished at the end of February.

Floor Plans. As noted above, each story of the new structure will house two offices in the southeast and southwest corners. It will also provide a new bathroom on every floor. Starting with the first floor, these will alternate Women's/Men's/Women's—and go a long way in alleviating the building's notorious facility limitations.

old bldg

skywalk

common floor plan



Final Remarks. Readers concerned about the several old trees near the building will be relieved to learn that serious attention was paid to saving as many as possible. Two arborists consulted with the heavy equipment operator to ensure minimal damage to the trees' root systems.

Stay tuned for the Spring 2007 newsletter, where we plan (hope?) to report on the elevator project's completion. In the meantime, the department once again thanks the College of Arts and Sciences and the Administration/Finance Office, without whose support this project never would have gotten off the ground.

To see more project photographs, please visit our website at
`http://www.umt.edu/math/construction`

The M-EID Students in the Mathematical Sciences

by Jon Graham

Erin Landguth came to the M-EID program this past fall from the South Dakota School of Mines and Technology, where she received a B.S. in mathematics and M.S. in atmospheric science. Broadly speaking, she is interested in modeling disease systems at the landscape level and proposes to develop a theoretical model integrating the mathematics of complexity, nonlinear systems, and statistical analysis, as well as explore the use of cellular automata to investigate complex interactive disease systems in prairie dogs. In April of 2007, she will undertake an internship with Dr. Jim Crutchfield, director of the Computational Science and Engineering Center at UC-Davis to study cellular automata and chaos. Her research is currently proceeding under the direction of Prof. **Emily Stone**, and will involve faculty from several departments. Outside of her academic interests, Erin is an avid runner and loves everything about the outdoors, including backpacking, cross-country skiing, flyfishing, and hanging out with her dog Newton. Could she have come to a better place?!?

Joran Elias graduated from the Department of Mathematical Sciences at The University of Montana with a master's degree in algebra in 2004, and has been working toward a Ph.D. in statistics since that time. He is originally from Auburn, Maine and came to Missoula after receiving a B.A. in mathematics from Dartmouth College in 2001. After acquiring a strong background in pure mathematics, Joran developed over the last two years an interest in statistics and its many applications in the sciences. He is specifically interested in statistical classification issues, has been working on improvements and extensions of bootstrap aggregation (bagging), and is looking for a disease system to which he can apply these tools. Joran has been conducting research under the direction of Prof. **Brian Steele** and is looking to involve quantitative biologists on his dissertation committee. Although Joran can often be found at the computer working on R code, he originally came to Montana because of the recreational opportunities and loves cross-country skiing, running, and biking. It should also be mentioned that Joran has added some youth and energy to the aging department soccer team!

Jasmine Nettiksimmons, who is originally from Billings, Montana, received her B.A. in mathematics from Bryn Mawr College in 2002 and worked at the Jet Propulsion Laboratory for NASA in Pasadena, CA as well as a design firm in Los Angeles. She returned to Montana to teach mathematics at MSU-Billings and entered our graduate program in the fall of 2003. She completed her master's degree in statistics under the direction of Prof. **David Patterson** in the spring of 2006. This project entailed an analysis of air particulate data collected in the Missoula valley as these data relate to hospital admissions for cardiac and respiratory conditions. Stemming in part from her master's project, Jasmine is interested in the use of statistics in epidemiology and human disease systems, particularly in underserved populations. She is currently looking for a dissertation topic in the area of multidrug-resistant tuberculosis. Upon completion of her M-EID doctorate, she would like to work in academic research or for a government health organization such as NIH or the CDC. Away from the office, Jasmine enjoys reading, knitting, sewing, and home improvement projects. Anyone need some painting done?

("NSF Award" - continued from front page)

course. In the process of initiating this program, contacts were developed with several national and international infectious disease-related research facilities to facilitate internship opportunities. Trainees are housed in a common area with a modern computer lab in the Davidson Honors College, and are provided very high stipends for the first two years of the program. It is anticipated that trainees along with participating faculty will apply for grant funding in part to support research after the first two years.

The principal investigator / director of the M-EID program is Bill Holben from the Division of Biological Sciences, with co-principal investigators Carol Brewer (Biology), Jon Graham (Mathematics), Jesse Johnson (Computer Science), and Mary Poss (Biology). In addition to these people, there are roughly 40-50 faculty at the University of Montana who actively participated in discussions and wrote sections of the grant proposal to help establish this program.

Some of those include Leonid Kalachev, Brian Steele, John Bardsley, Emily Stone, David Patterson, and George McRae from the Department of Mathematical Sciences. Thanks to all of these folks for making this program possible!

As a footnote, it should be mentioned that the University, mainly through the efforts of Bill Holben in DBS, recently (September 2006) received a grant from the Howard Hughes Institute to develop an integrated undergraduate education program to train undergraduates to deal with complex problems in biology. This program, known as the Montana Integrative Learning Experience for Students (MILES) program seeks to attract students with mutual interests in biology and mathematics among other areas to receive an interdisciplinary research experience. Discussions regarding the implementation of this program are ongoing, but it should dovetail nicely with the graduate M-EID program.

Alumni News

Kadin Bardsley (B.A. 2000) now lives in Missoula, where he is a home builder and appraiser. Our recent graduates know his brother, Assistant Professor John Bardsley, who joined the department in 2003. Some of Kadin's projects over the last few years could be called "mathematical constructions": He built his brother's house, re-roofed the house of Department Chair Dave Patterson, and built a new garage and addition for Math 100 Coordinator Matt Roscoe.

Congratulations to **Paul Duffy** (M.A., 1998), who received his Ph.D. in ecological modeling through the interdisciplinary studies program at the University of Alaska, Fairbanks. The work on his dissertation, "Interactions among climate, fire and vegetation in the Alaskan boreal forest", was funded by the Joint Fire Science Program. He is currently an adjunct professor in the Forest Sciences Department at the University of Alaska, Fairbanks, and also works as a statistical decision analyst for the environmental consulting firm Neptune and Company.

We recently received news from **Kendra Lockman** (formerly **Kendra Eyer**) (B.A. 1998, M.A. 2000), who is now an editor for Key Curriculum Press, a company that publishes high school math books, and distributes some well-known math software packages (Geometer's Sketchpad, Tinker Plots, and Fathom Dynamic Data). Kendra has thus far edited ancillaries for their precalculus and geometry books. Part of her job involves editing and sometimes creating student activities with Geometer's Sketchpad. She wrote: "I love my job, although I admit that I miss having *months* of vacation time. I also miss the math, but I find that I encounter and indulge in enough of it on my own to keep me happy." That sounds like a great job for a math major!

Mike Lundin and **Lynn Turnquist** (M.A. 1989) stopped by the Math Department this summer while doing some hiking in Montana. Mike did graduate work at UM and received his doctorate in math education from Montana State in 2001. He is an Associate Professor in the Mathematics Department at Central Washington University in Ellensburg. Lynn is an Associate Professor in the Mathematics Department at Utah Valley State College in Orem.

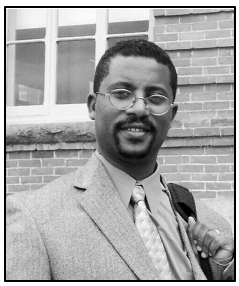
Chris Vahl (B.A. 1991, M.A. 1995) and his wife Qing Kang have both taken positions in the Statistics Department at North Dakota State. They both received their Ph.D.'s in statistics at Kansas State in 2005. And their first child, Sydney, was born last April. Congratulations on all these achievements, Chris and Qing!

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

Welcome Solomon Harrar

by Dave Patterson

The Department of Mathematical Sciences is pleased to welcome new tenure-track Assistant Professor Solomon Harrar who joined the department this fall. Solomon received his Ph.D. in statistics from Bowling Green State University in 2004 and was an Assistant Professor at South Dakota State for two years before taking the position here.



Solomon's dissertation was on "Linear Models under Nonnormality" under Dr. Arjun Gupta. His research focuses on the asymptotic expansion of test statistics under nonnormality and, more generally, on nonparametric inference for multivariate data. Solomon's strength in mathematical statistics is a good complement to the more applied focus of the other statisticians. He has already become involved in a joint research project on supervised learning with Brian Steele and David Patterson.

Solomon grew up in Addis Ababa, Ethiopia and received his Bachelor's and Master's degrees in statistics from the University of Addis Ababa. He taught there for two years before coming to the U.S. to work on his Ph.D. Solomon's wife Sosena, also from Addis Ababa, is working on a degree in accounting.

("Euler Number e" - continued from page 3)

Now let me show you why this implies that e is an irrational number. To do this, we first show that every interval I_n is of the form

$$I_n = \left[\frac{a}{n!}, \frac{a+1}{n!}\right]$$

for some integer a. (The number a changes as n changes.) Consider formula $(*)$ for the left endpoint L_n of I_n. After bringing all summands onto the common denominator $n!$, let a be the sum of the numerators. Then $L_n = \frac{a}{n!}$. And since the length of I_n is $\frac{1}{n!}$, the right endpoint of I_n is

$$L_n + \frac{1}{n!} = \frac{a}{n!} + \frac{1}{n!} = \frac{a+1}{n!},$$

as desired.

We now conclude this article with a short proof by contradictions. Suppose to the contrary that e is a rational number. Then $e = \frac{m}{n}$ for some positive integers m and n. Then also

$$e = \frac{m \cdot (n-1)!}{n \cdot (n-1)!} = \frac{m \cdot (n-1)!}{n!}.$$

But $e = b$ belongs to the subinterval I_{n+1} of the interval I_n, so e must lie strictly between the endpoints of I_n. Thus the numerator of e (namely $m \cdot (n-1)!$) must be an integer strictly between the integers a and $a+1$, which is impossible! This contradiction proves that e cannot be a rational number. Thus e is indeed irrational.

Opportunities for Students and Faculty at University College Cork in Ireland

by Leonid Kalachev

University College Cork in Cork, Ireland, is Ireland's leading research institution. It is also one of the many international partner universities of the University of Montana. In April 2006, I took part in a week-long international workshop on Multi-Rate Processes and Hysteresis at UC Cork, presenting an invited lecture. I also met with the Director of International Education at University College, Ms. Louise Tobin, and with the Director of the School of Mathematics, Professor Jim Gleason. Among the topics we discussed were the joint UM – UC Cork conference scheduled to take place in October of 2006 (Scott Lambert, a graduate student of our department, and I made presentations at this conference), and possibilities for faculty and graduate student exchanges. The School of Mathematics at UC Cork is very active in the fields of applied mathematics (dynamical systems, partial differential equations, fluid mechanics, etc.), pure mathematics (real analysis, functional analysis, complex analysis), and statistics (Bayesian statistics, design of experiments, classification methods, etc.). I encourage both students and faculty in the math department to consider UC Cork for an exchange program or a sabbatical leave.

Directors Jim Gleason and Louise Tobin from UC Cork and Professor Leonid Kalachev

Locally Grown, Globally Known—A Journal Reborn

by Bharath Sriraman

Since 2003, the Department of Mathematical Sciences has been the new home of *The Montana Mathematics Enthusiast*, the electronic journal of the Montana Council of Teachers of Mathematics. This journal is the successor of the *Montana Mathematics Teacher*, a print journal which went extinct in the late 90's. The author took over the revival of the journal in 2003, and three years later, *The Montana Mathematics Enthusiast* is not only flourishing but has gained international recognition in the mathematics education community as an eclectic journal covering mathematics content, mathematics education research, interdisciplinary issues and pedagogy.

Journal articles have covered a wide spectrum of topics related to mathematical thinking, teaching and learning at all levels, with secondary foci being accessible mathematics content in areas like algebraic geometry, theory of equations, Euclidean and non-Euclidean geometries as well as broader political and social issues related to mathematics education. The journal has also published articles addressing historical, philosophical and cross-cultural perspectives on mathematics content, its teaching and learning.

Among the articles appearing in the journal are papers written by former and current undergraduate and graduate students in the department. The most recent volume contains articles by **Joran Elias** (M.A. 2004, currently working towards his Ph.D. in Statistics), and **Birch Fett** (B.A. 2004, M.Ed. 2005).

The journal's international editorial board includes many distinguished researchers who have supported the peer review process as well as the dissemination of journal articles. The journal has thus far been accessed from 90+ countries and garnered indexing in major mathematics education research data bases. Readers of the news letter are encouraged to visit the journal website at http://www.montanamath.org/TMME/ to peruse the contents of the journal. An embedded statistical feature allows readers to access worldwide journal usage statistics. The semiannual journal will soon switch to three issues a year due to the significant increase in the flow of manuscripts. For example, in the twelve-month period ending in May 2006, 46 manuscripts were received of which 16 were published after peer review in the two issues of volume 3.

Last but not least, the geographic range of the authors and the sheer magnitude of perspectives presented by the articles both embodies the spirit of the journal and testifies to the benefits of open access for the exchange of ideas across institutional and national boundaries.

In January 2007, *The Montana Mathematics Enthusiast* will release a special printed monograph issue on international perspectives on social justice in mathematics education. This print monograph was made possible through support by the Department of Mathematical Sciences and the Center for Learning and Teaching in the West.

Math Club Corner

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

by Nikolaus Vonessen

For quite a few years, Professor **Jenny McNulty** was the advisor for our Math Club, and by all accounts, did a wonderful job! It will be hard for me as her successor to live up to the high expectations the department has grown accustomed to. During the summer, Jenny met with me several times, and thanks to her assistance and advice, the semester went off to a good start.

During the first part of the fall semester, the Math Club spent quite a bit of time on an ambitious project: proofreading an entire chapter (125 pages!) of the solutions manual for a forthcoming calculus textbook. This entailed first working each problem, and then making sure that the publisher's solution was both accurate and well-written.

When I learned of this project in August, I was convinced we'd never be able to do this, and only grudgingly agreed to honor the commitment made by the Math Club last April. Rumor has it that students were at that point very excited about this, since the publisher promised to pay $500 for this task (and the work was to be done by someone else in the very distant future).

The new students comprising the Math Club this fall were, however, the ones to do the job, and were thus initially not quite so enthusiastic. But with the help of many students and several faculty members, the project gained momentum. After our second "Proofreading Party" (with pizza sponsored by the math department), the job was actually done, and just on time - two days before the deadline! Afterwards, the publisher's representative thanked us for the "incredibly thorough job".

Next semester the Math Club has the much more pleasant task to decide what to do with our reward. One possible use, requested again and again over the years, is to purchase lockers for students. With the elevator addition, we may finally have enough space for the lockers. And the $500 we just earned would at least be a start for this even more ambitious fund-raising project. As for me, I learned a lesson: next time, I'll be more optimistic!

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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