

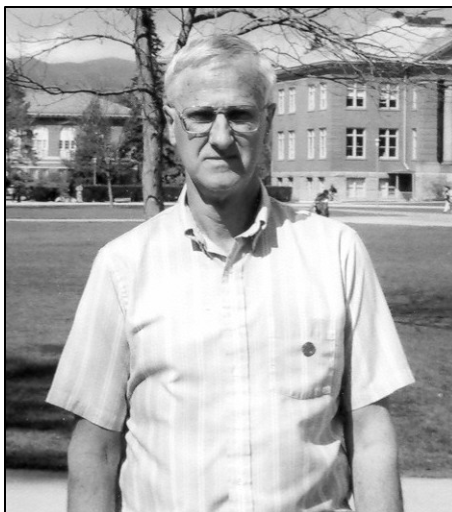


Two New Retirees

by Jim Hirstein

Two of our long-serving faculty became the newest Professors Emeriti in the Department of Mathematical Sciences this past spring.

Rudy Gideon retired after 35 years on the faculty. He earned his PhD in Statistics from the University of Wisconsin in 1970. That fall, he came to the University of Montana as an Assistant Professor. He was promoted to Associate Professor in 1974 and Full Professor in 1979. Rudy taught a broad range of statistics courses for the department, from large-lecture service courses to advanced graduate seminars. He worked hard to develop our introductory probability course for



Rudy Gideon

students preparing to study statistics. For the past seven years, he also designed and taught our specialized



Johnny Lott

course — *Numbers as News* — for Journalism majors. His research led

(Continued on page 5: Retirees)

Cutting Cake for Greedy People

by Lily Eidswick

The Department of Mathematical Sciences and its Math 107 students were in for a special treat when **Ed Burger**, large knife in hand, came to UM last spring to give a fascinating lecture on how to slice up scarce resources fairly. The colloquium was the culmination of a 3-day visit by Dr. Burger, Professor and Chair of the Mathematics Department at Williams College. "Math Ed", as he likes to call himself, has written numerous articles, books and videos and is one of the authors of our current Math 107 text, *The Heart of Mathematics*.

In terms of cake slicing, the fair division problem may be stated as follows: How can a cake be divided among n people so that everyone is satisfied with the division? Considering that different people are likely to have different value systems, the problem seems impossibly difficult. For instance, how can we fairly divide a cake into three pieces if one person cares only for frosting, another for the name written on the cake, and the third for eating as much cake as possible? Starting with the simplest cases $n = 1$ and $n = 2$ and taking into

consideration all possible value systems, Ed walked the audience through cake-drooling solutions. The case $n = 3$ reveals a subtle trap as well as the depth of the general problem. At this point in the talk, Ed held the knife above the cake near one edge and slowly moved it toward the opposite edge instructing the audience to call out "Stop!" when they thought the portion to the left of the knife represented a fair share. The cake was then cut, leaving the remaining portion to an "I-cut, you-choose"



Edward Burger

(Continued on page 3: Cutting Cake)

New Tenure-track Faculty for 2005-06

by Mark Kayll

As a result of its 2004-05 personnel searches, the department was fortunate to add two new faculty to its ranks: one in analysis and one in combinatorics.

Jennifer Halfpap

Dr. Halfpap completed her PhD in complex analysis at the University of Wisconsin earlier this year. In addition to serving as a Teaching Assistant in Madison — and eventually as a TA Coordinator there — she also held



New Assistant Professor Jennifer Halfpap

a position in 2001 as an Instructor at her undergraduate alma mater, Ripon College, Wisconsin. We're delighted that she has now joined the UM faculty.

Jennifer's research interests include harmonic analysis and several complex variables, and a couple of her papers—on 'tube-like CR manifolds'—have already

been published in mathematical journals. UM's first analysis hire in more than ten years, Dr. Halfpap is being received enthusiastically by the other Analysis faculty, Professors Stroethoff and Tonev.

Once in Missoula, she wasted no time contributing more broadly to the department. In September, she gave a talk entitled *How big is the Cantor set?* in the Undergraduate Math Seminar. In it, she explored several ways of quantifying the size of a set (e.g. via cardinality, measure, and dimension) and revealed some of the surprising realities about the infamous Cantor set.

Jakayla Robbins

Dr. Robbins earned a PhD in matroid theory from the University of Kentucky in 2003. In the short time since then, Jakayla has squeezed in stints as a Postdoctoral Visitor (at her alma mater), a Visiting Assistant Professor (at 'Ole Miss', the University of Mississippi), and



New Assistant Professor Jakayla Robbins

now as a tenure-track Assistant Professor at UM. Her research interests center on matroids— including their representation theory and orientability—but also stretch more broadly into general combinatorics, e.g., pattern avoidance. Thus, Dr. Robbins' specializations nicely complement those of the three other Combinatorics & Optimization faculty (Professors Kayll, McNulty, and McRae).

Early this fall, Jakayla jumped right in and started making a positive impact on the C & O seminar. The primary paper under study, on combinatorial game theory, happened to be co-authored by a colleague, Richard Ehrenborg, from Dr. Robbins' former travels. So she quickly arranged for NSF-EPSCoR funding (federal monies administered locally) to help support a visit by Professor Ehrenborg from the University of Kentucky. Landing this distinguished visitor to coincide with the study of one of his papers was a small coup unto itself.

The department extends warm welcomes to Assistant Professors Halfpap and Robbins.

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method. Although this $n = 3$ division method might at first glance seem fair, Ed pointed out that it could easily result in envy by one or more of the participants. Thus one is led to a modified search for a "fair but not greedy" division algorithm. The final result, with approximation error dependent only on the thickness of the knife, was more than mathematically satisfying: the audience even got to eat the cake!

As noted, the cake-cutting colloquium was the culmination of a 3-day visit to the department. Ed's other activities included taking charge of a couple of Math 107 classes and meeting with the Math 107 staff. His passion for teaching came through in the classroom. The students found him charming and humorous and were enthusiastic about his presentations. Although Ed uses humor in his approach to mathematics, he takes his teaching seriously. The session with the Math 107 instructors provided an excellent exchange of ideas on what should be taught in a "contemporary" math course as well as how those ideas should be presented.

Burger capped off his visit with a hike up to the "M" on Mount Sentinel plus a Greenough Park/ Rattlesnake bicycle ride.

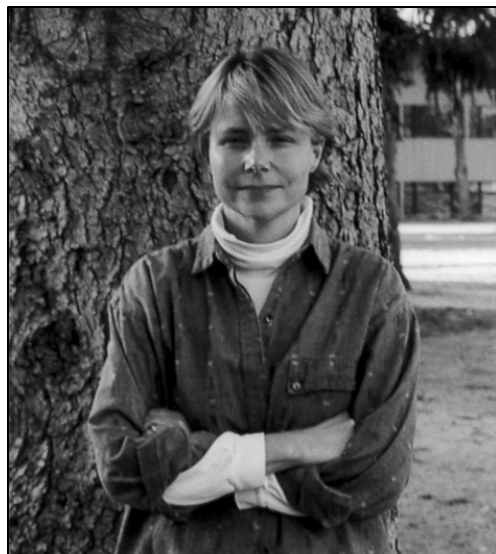
New Faculty Member in Applied Math and Dynamical Systems

by Leonid Kalachev

Associate Professor **Emily Stone** joined the faculty last year in the Applied Mathematics group. She has a PhD from Cornell University in Theoretical and Applied Mechanics, where her advisor was Philip Holmes, now at Princeton University. Her thesis focused on the formation and analysis of reduced models for turbulence, and since then she has pursued research in the general areas of modeling and applied dynamical systems. Prior to coming to the University of Montana she was an Associate Professor in the Department of Mathematics and Statistics at Utah State University, where she was part of a small group that established an industrial mathematics program with a master's degree. Emily's research is inherently interdisciplinary, and has involved modeling such diverse systems as machining dynamics (at The Boeing Company) and the polymerase chain reaction (in collaboration with Idaho Technology, a biotech firm in Salt Lake City).

Since her establishment in Montana, Dr. Stone has initiated ties with the Center for Structural and Functional Neuroscience (CSFN) through an NSF Interdisciplinary

Grant in the Mathematical Sciences (IGMS). This commenced at the start of the present academic year. Dr. Stone is currently collaborating with UM colleague Dr. John Bardsley and a graduate student on a problem in the dynamics of networks of leaf stomata in respiring leaves. She explains that "research is my focus, teaching keeps me grounded, and at UM I have found talented students to work on projects, allowing me to combine the two, a nice happenstance in mathematics".



Associate Professor Emily Stone

Tibetan Mathematician Visits UM

by Thomas Tonev

As a result of a fortunate cooperation between the Office of International Programs and the Department of Mathematical Sciences, an ethnic Tibetan Mathematician visited the University of Montana. **Guru Kyi** is a Professor of Mathematics at the Northwest Minority University in Lanzhou, China, where she teaches mathematical analysis, advanced mathematics, elementary geometry, history of mathematics, and mathematics education. She earned her BA (1986) in Mathematics Education (on Tibetan and Chinese bilingual education) from the Minority Teachers College at the Qinghai Teachers University, China. Her MA is in Computer Science from the Northwest Minority University in Lanzhou for Nationalities. Currently she is involved with a research program on Tibetan Information Technology—Mathematics Curriculum and Theory, run by Beijing

Capital Teachers University and Qinghai Teachers University. Professor Kyi was instrumental in the creation of the first calculus textbook in Tibetan.

The city of Lanzhou is in Gansu province of China. It lies on the ancient Silk Road, the only surface trade road connecting Europe and China during the middle ages. The Yellow River runs through it. The Discovery Channel's *Inside Guide China* reads: "Surrounded on all sides by mountains, present-day Lanzhou is a depressing industrial city, smothered in a layer of thick grey smog. (In an only China turn, the local government began to level the surrounding mountains in 1997 to try to ease the pollution)".

Besides Chinese students, the Northwest Minority University in Lanzhou educates people from many ethnic minorities: Tibetans, Mongolians, Uigurs, etc. Minority students in

China are at a disadvantage in comparison to their ethnic Chinese counterparts. Written in Chinese, most of the textbooks and supplemental educational materials are inaccessible to non-native speakers. This is why their education lasts one year longer, and the Minority University in Lanzhou has special programs for them.

Guru teaches both Tibetan and Chinese students: the former in Tibetan, the latter in Chinese. She was born in the Tibetan province of Qinghai (or, Amdo in Tibetan), neighboring Gansu province and not far from the Dalai Lama's birthplace, which she has visited several times. Guru in Hindu means spiritual teacher (in Tibetan it is 'lama'). However in official documents her name is replaced by its Chinese version Geriji. I met Guru in the summer of 2002 during the International Mathematics Conference

(Continued on page 5: Tibetan Mathematician)

Combinatorics of Advising

by Mark Kayll

At the university's spring awards ceremony, the 2005 Outstanding Faculty Advising Award was presented to one of our own colleagues.

The nomination letter began, "Professor **Jenny McNulty's** commitment to quality advising manifests itself in a striking number of ways. From departmental, to campus-wide, from the local community, to the national stage, and from academics, to all-around character building, Dr. McNulty exemplifies the university citizen that this award seeks to recognize." Besides her departmental advising, Jenny has served as a General Studies Advisor at University College since 1997. At the graduate level, she's supervised six MA and two PhD students. She's also the Faculty Advisor for the UM Women's Hockey Club (since 2000) and for the UM Math Club (since 2002). Professor McNulty's advising impacts have also been felt regionally and nationally; in 2000, she founded and now directs the Pacific Northwest Section Project NExT program (New Experiences in Teaching). Through this faculty mentoring program, Dr. McNulty has influenced a new academic generation of advisors. These are just a few of the many highlights that caught the attention of her nominators.

Professor McNulty's acceptance speech folded together interesting advising tidbits with basic combinatorics. "When I think about advising, I think of possibilities and opportunities. There are so many avenues for a student to explore as they travel on their journey to get an education. As an advisor, I try to help them navigate their trip. As a mathematician, I find the number of possibilities amazing. Did you know.... there are over 54 courses that count towards the general education expressive arts perspective, 90 for literary and artistic studies, 128 for history, 92 for social sciences, 43 for ethics, and 63 for the natural sciences. A quick calculation shows there are over 380 Trillion (3.8×10^{14}) ways to take courses in the perspectives AND over 2 Quintillion (2×10^{18}) ways to complete UM's General Education Requirements. (For comparison, the US deficit is \$477 billion — so this is a billion times the deficit.) Maybe a new university slogan could be: UM — over a billion billion choices!"

The department congratulates Professor McNulty for her well-deserved award.

(Continued from page 1 - Retirees)

to talks and papers on non-parametric correlation, and he served as a reviewer for many papers in statistical journals. A few years ago, he was instrumental in securing the funding for a large endowment that supports scholarships for our majors. Professor Gideon consulted for many projects around Montana, served as the principal investigator on a federal grant, and directed the research of more than twenty graduate students.

Johnny Lott retired after 31 years in the department. He completed his PhD at Georgia State University in 1973 and joined the University of Montana as a Visiting Assistant Professor in 1974. Two years later, he joined the tenure-track ranks, was promoted to Associate Professor in 1978, and to Full Professor in 1983. Johnny chaired the department from 1990 to 1992. He built an excellent teaching record and contributed significantly to research in mathematics education. His book for elementary mathematics teachers, now in its eighth edition (with UM colleague Rick Billstein and University of Oregon's Schlomo Leibeskind) has served as the standard in the field for three decades. Over the years, Dr. Lott published many articles and delivered hundreds of presentations to state, national, and international audiences. He was the recipient of numerous research grants at the state and national levels. Most recently, he was co-director of the Systemic Initiative for Montana Mathematics and Science (SIMMS), a seven-year curriculum development grant funded by the National Science Foundation. In 2001, Johnny was elected President of the National Council of Teachers of Mathematics, the premier organization in his field. His influence on mathematics teaching, while clearly felt here at UM, extends far beyond. Professor Lott retires truly recognized as an international leader in mathematics education.

The department will not quickly fill the voids created by these recent retirements and it wishes Professors Gideon and Lott the very best as they start down their new life paths.

(Continued from page 4: Tibetan Mathematician)

held in Lhasa, the main city of Tibet. She was the only Tibetan participant with any knowledge of English. The rest of her Tibetan colleagues presented their talks either in Tibetan through a translator or in Chinese at a separate session.

During her UM visit, Ms. Kyi delivered a lecture on Tibetan cultural heritage at the Mansfield Center for Asian and Pacific Studies. She described the cultural and religious importance of Tibetan symbols such as thangka and stupas. Thangka is a silk, satin or cloth painting scroll with images of Buddha or of life stories of eminent deities, monks, and folk customs. Stupa ('chorten' in Tibetan) is a religious monument symbolizing Buddha's physical presence. Stu-

(Continued on page 6: Guru Kyi)

Graduate Degree Recipients

Name	Degree	Date	Title	Advisor
Robert Barlow, Jr.	M.A.	2003	<i>Course scheduling solution</i>	Dr. McNulty
Lucas A. Casady	M.A.	2004	<i>Asymptotic reductions of a model describing facilitated diffusion in membrane transport</i>	Dr. Kalachev
Johnathan Comes	M.A.	2004	<i>Computation on the functor Ext using Groebner bases</i>	Dr. Nyman
Isaac C. Grenfell	M.A.	2004	<i>Robust variogram estimation via rank correlation and median absolute deviation correlation</i>	Dr. Gideon
Joseph Lee Petersen	M.A.	2004	<i>Estimating Pareto Parameters</i>	Dr. Gideon
Brook Russell	M.A.	2004	<i>Issues in classifying ordered categorical data</i>	Dr. Patterson
Chris Anne Clouse	Ph.D.	2004	<i>Greedoid invariants and the greedoid Tutte polynomial</i>	Dr. McNulty
Young-A Choi	M.A.	2005	<i>Group Theory in a Kaleidoscope</i>	Dr. Hirstein
Joran M. Elias	M.A.	2005	<i>Automated geometric theorem proving: Wu's Method</i>	Dr. Nyman
Kira Lynn Heater	M.A.	2005	<i>The FDTD Method: Computation and Analysis</i>	Dr. Bardsley
Mohammed Shoeb Saed Khan	M.A.	2005	<i>Mathematical analysis of tropospheric chemistry model</i>	Dr. Kalachev
Peter J. McCauley	M.A.	2005	<i>Dynamics of a single species natural forest in the presence of a disease</i>	Dr. Kalachev
David Perkins	Ph.D.	2005	<i>Investigations of a chip-firing game</i>	Dr. Kayll
Deborah Sloan	Ph.D.	2005	<i>A conflict in values: The dilemma of equity, diversity, and participation in higher mathematics</i>	Dr. Hirstein

(Continued from page 5: Guru Kyi)

pas either cover tombs of high lamas, or house sacred religious objects.

Guru also took part in the Women Panel Discussion on International perspectives on Education, organized by the Phi Delta Kappa society and the UM School of Education. There she discussed the problems of hate encountered by Tibetans in primary and high school education.

In her Mathematical Sciences Colloquium, Professor Kyi delivered the lecture *Tibetan Thangkas, Stupas, Astronomy and Mathematics*, illustrated with impressive images. In this talk, she unveiled the hidden geometry in thangka images, and surprised many of us with the connections to analytic geometry. In particular, in the con-

struction of stupas, Tibetan master-architects used essentially Cartesian coordinates long before their formal introduction by René Descartes in 17th century Europe. The lecture was accompanied by breathtaking oriental images and Tibetan scripts. Moreover, in an only Tibetan way, the measurements and proportions of stupa's design were canonized and sanctified. What makes it 'only Tibetan'? And how were they sanctified and canonized? At the UM Mathematics Education Seminar she answered these questions and spoke on the past and present of Mathematics Education in Tibet.

Guru Kyi met with many UM faculty members, students, and members of the Missoula community. She also

visited my multi-variable calculus class, attended the 'Problems and Contests' seminar of Professor George McRae and Dick Lane, and presented a lecture on the history of mathematical knowledge in Tibet to Professor Johnny Lott's History of Mathematics class.

The lectures and talks of Guru Kyi at the University of Montana attracted many professors, teachers and students of mathematics and other fields. We were lucky to learn firsthand about the ancient and rich Tibetan culture and the mathematics behind it.

2005 Mathematics Scholarships & Awards

Joseph Hashisaki Memorial Scholarship

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

Andrew Bissell

Mac Johnson Family Endowment Scholarships

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

Chelsea Bestram
Williamson Prudhomme
Anita Sindlair

N.J.Lennes Awards

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

Andrew Bissel (1st)
Michael Michalak (2nd)
David Yao (3rd)
Vanessa Johnston (Honorable Mention)
David Maurer (Honorable Mention)
Hallie Torrey (Honorable Mention)

Undergraduate Teaching Scholar

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

Andrew Bissel

Undergraduate Tutorial Scholars

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

John Case
Williamson Prudhomme
Hallie Torrey

John A. Peterson Mathematics Education Award

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

Sean McGlynn

Graduate Student Distinguished Teaching Awards

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

Samantha Allen
Seth Braver

Graduate Student Summer Research Awards

(\$1600 to \$3200)

Seth Braver
N'Djekornom Dara Laobeul
Aaron Luttmann

Graduate Student Outstanding Presentation *(CAS Graduate Student—Faculty Research Conference)*

Aaron Luttmann

President's Senior Recognition Awards

Renee Fite (Pi Mu Epsilon)
John Goldes (Applied Analysis)
Sean McGlynn (Mathematics Education)
Steve Pettinato (Statistics)

Pi Mu Epsilon New Members

Chelsea Bestram	Amber Buchanan
Songe Chanda	Shannon Johnson
Aaron Luttmann	Cody Ray
N'Djekornom Dara Laobeul	

Visiting Faculty

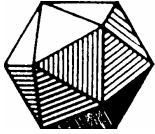
by David Patterson

We are very pleased to have two distinguished visiting faculty in the Department of Mathematical Sciences this year.

Anatoly Yagola is Professor of Mathematics at Moscow State University and an internationally known authority in applied mathematics, particularly ill-posed problems and numerical methods. He has authored or co-authored more than 200 papers and 12 monographs. He is teaching two courses in applied mathematics this fall as

well as conducting joint research with our applied mathematics faculty. He will be here through December.

Machelle Wilson is a statistical ecologist, visiting for the year from the Savannah River Ecology Laboratory of the University of Georgia. Her expertise includes statistical methods in risk analysis and in environmental monitoring, policy and decision-making. In addition to teaching the graduate-level statistical methods course (for students in the sciences) and our junior-level probability course, she is also participating in the statistics seminar. Her interests complement those of the other statisticians, and they look forward to interacting with Machelle during the coming year.



Math Club Corner

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



by Cody Ray and Mark Kayll

In the Autumn 2005 semester, the group known as the Math Club continued its weekly meetings during the Undergraduate Math Seminar, 3-4 pm Tuesdays.

This year a new faculty advisor, Dr. Jon Graham, joined Professor Jenny McNulty in leading the seminar, while former co-advisor Professor George McRae continued as an active participant. Club activities included attending lectures by local

and visiting faculty, reading the book *Life by the Numbers*, by Keith Devlin, taking a field trip to the Missoula Fire Lab, and hosting our annual Gambling Day. The lectures covered topics in pure math (e.g. *What is Algebra?* by Professor Nikolaus Vonessen), applied math (e.g. *Mathematical Modeling of Cellular and Molecular Biology*, by Associate Professor Emily Stone), and somewhere in between (e.g. *Coloring Polynomials*, by Assistant Professor Jakayla Robbins). One memorable

guest speaker was Professor Richard Ehrenborg, from the University of Kentucky, whose talk, *The Mathematics of Juggling*, came complete with demonstrations.

The Club thanks all the faculty who generously gave their time to share so many mathematical gems. As always, we invite anyone and everyone to join us for snacks and club activities every Tuesday. You can check the club home page, above, for the schedule.

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