

Mathematical Sciences

George McRae: the 50 Year Anniversary

By Jim Hirstein



George McRae began teaching college mathematics at the University of Montana fifty years ago in the fall of 1961, just after he finished his master's degree here. He was from eastern Montana, spending his first years on the family ranch about 25 miles east of Jordan, as

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he says "on the Big Dry." He recalls walking or riding horseback several miles to the one-room Van Norman School, which had an enrollment of 3 students at the time. After a few years, the school was moved 12 miles further down the creek – too far to walk. After his two older brothers had begun attending UM, his mother brought the younger children from the ranch to Missoula during the school year. George started at Willard School in the 5th grade. He graduated from Missoula County High School, attending his final semester at the brand new South Avenue Campus (now Sentinel High School). He finished his BA in 1960 and an MA in 1961, working with Professor Hashisaki. He taught here one year before heading to the University of Washington to work on a PhD.

At UW, George studied with the algebraist James P. Jans, graduating in 1967 with a dissertation on "Coherent Rings and Homology." He spent the next three years on the faculty at the University of Illinois at Urbana-Champaign. George says this position provided a great opportunity to expand his thesis to a broader context. He participated in the Midwest Category Theory Seminar and applied that to algebra. Other great seminars introduced him to discrete mathematics and optimization, so he developed a

keen interest in that. Then, in 1970 George and his wife, Neva, and their children, Loreen and Scott, came back to Missoula to stay. George took a job in our Mathematical Sciences Department, where he has spent the rest of his career.

With one exception, George has spent the past forty-one years here. He took a one-year sabbatical at Georgia Tech in 1976-77, which gave him an opportunity to spend some time with his brother, a professor at the University of Georgia in Athens. Back in Montana, George has been a tireless advocate for the Department. First as a student, then later as advisor, he has always participated in the UM Mathematics Club. He helped establish the honors program in calculus, and he has taught it many times over the years.



Along with Bob McKelvey, George helped create the Operations Research Emphasis in the Department (now called Combinatorics & Optimization). He has long been a sponsor of the “problems and contests” seminars, contributing to our local Lennes Examinations, the Putnam Competition training, and the Applied



Mathematics Team Competition. He has served as advisor and committee member on a number of Senior and Master’s theses, and he has directed (or co-directed) six PhD students.

He also has done a great deal of public service. He

has served on the Board of Directors and held office for the Montana Academy of Sciences. He was on the Board of Directors (and was President of the Board) for the Rocky Mountain Mathematics Consortium. He was elected Governor of the Pacific Northwest Section of the Mathematical Association of America. He has traveled throughout the state on recruiting tours for the University of Montana. In 1993, he received the Robert T. Panzer Presidential Humanitarian Award from the University.

The Department of Mathematical Sciences salutes Professor George McRae as he begins his fiftieth year teaching mathematics.

Rick Billstein Retires

Friends, family and faculty gathered to honor Mathematical Sciences professor Rick Billstein’s emeritus status with a celebration earlier this semester. After 42 years of dedication to the University, Billstein will finish teaching classes this semester.

The celebration was held in The Payne Family Native American Center’s Bonnie HeavyRunner’s Gathering Place. The Department of Mathematical Sciences presented Billstein with a plaque commemorating his service. He was also given a box of golf balls as



he is an avid golfer. One ball was pre-lost for him.

Billstein earned his B.A. in mathematics in 1966 from MSU-Billings. He completed his Master of Arts degree at the University of Montana. He joined the University as an instructor for mathematical sciences in 1969. He received his PhD from the University and became an Assistant Professor in 1973.



His numerous achievements include serving as the Department Associate Chairman and acting as the director of the seven-year-long “Six Through Eight Mathematics Project.” Over the years, Billstein brought in millions of dollars in grants for the University and in 2011, he received the Dennison Presidential Faculty Award for Distinguished Accomplishment.

Remembering Sangadji



Sangadji passed away in late November in Indonesia of a stroke. He had a loving family and will be greatly missed. He received his PhD in Mathematics in 1997 from the University of Montana under Karel Stroethoff. He was close to Professor Johnny Lott and the two kept in contact after Sangadji graduated. Recently, Johnny was a speaker at the 5th ICREM conference held from 22-24 Oct. 2011 in Indonesia. He visited with Sangadji and sent this photo. In one of his last letters to Johnny, he wrote, “Sometimes I still remember the good times when I studied, taught and also took care of my kids in Missoula.”

Notes from the Chair

By Leonid Kalachev

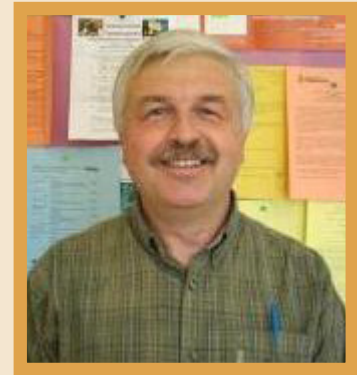
In this column I would like to discuss some new activities and developments in our department and delineate the challenges that we face in the coming years. Even before I start, I would like to express my absolute confidence in our being able not only to face, but also to overcome these challenges. We are a friendly, hardworking and professionally active department. I hope that the current atmosphere of collegiality, of being welcoming of new faculty members and helping them to grow professionally, of involvement in service, mutual support and respect will continue. Our department has a very unique working environment. Let us embrace and strengthen it.

This semester the number of courses taught in dual format, that is, both face-to-face and over the internet, has increased to four. The successful experiment, which started in the spring semester of 2011, is now being expanded. There is a lot of speculation as to whether mathematics can or cannot be taught successfully on the web. Lauren Fern, one of our lecturers, has developed the first general education math course M105 (Contemporary Math); two sections of this course are now being taught. However, extension of the pure web-based mode of material delivery to upper level math courses is questionable. The dual-delivery mode allows professors to teach in a usual class environment and for the students (e.g., 13 math teachers from all over Montana, 8 students at the University College Cork in Ireland – one of our sister universities) to watch the lectures at the times convenient for them. They can ask questions over the phone, Skype or

email. We will analyze the students' performance in dual delivery courses at the end of this semester, make improvements, and hopefully expand these types of courses further.

Historically, the discrepancy between the number of math courses offered in the fall semester and the number in the spring semester is quite pronounced. While in the fall we need a lot of adjuncts to help us with teaching, there are no classes for them to teach in the spring. I will try to accommodate the adjuncts in the spring as much as possible; however, this problem must be addressed at the CAS and at the university level. I am now trying to attract the attention of the UM administrators to this urgent problem: unless the university takes care of the work force, there may not be enough qualified people to teach when we need them.

Another difficulty that we face is that of populating our upper division math courses. The number of our teaching assistantships was increased by one this fall. Several of our graduate students are expected to finish their PhDs in the spring of 2012, and I hope we will be able to attract a cohort of new talented graduate students. While our PhD production has increased dramatically over the past couple of years, we need to think about a more balanced distribution of our students between the Masters program and the PhD program to make sure that we do not have to cancel classes. One way to increase our enrollment is based on the understanding that the Mathematical Sciences Department at the UM is here to also serve other departments' needs. In particular, I would like to emphasize the introduction of a new statistics



course for biomedical students now being developed and taught by Solomon Harrar, as well as the section of the M105 course for music majors developed and taught by Mark Kayll.

Our SPABA reserves are sufficient to support the travel needs of our faculty members for only another year. Unless we increase our grant proposal (and award) activity, the funds available for travel per year will have to be drastically reduced. To increase SPABA we have started working on establishing a Statistics/Applied Math consortium within the department. This consortium would offer a resource that could be utilized by faculty from outside mathematics whose grant proposals have a heavy statistical/mathematical component. If this program is successful, this will bring to the department additional external funds to support faculty travel and research related needs.

I wish everyone all the best for the Holiday Season! Have a very Happy New Year!

Math Camp Provides UM Math Students with Middle School Teaching Experience

By Bonnie Spence

If you were in the math building the first week of August you probably heard twenty middle schoolers excitedly analyzing strategy games and discussing solutions to various problems as they extended their math studies in a week long summer camp, run this year by UM math students. Four years ago the camp developed from an idea of Dave Patterson and Bonnie Spence with the hope of getting at least 10 students to participate. Now, with a well-developed curriculum and full enrollment of 20 campers, the program has evolved to provide UM students interested in math education with further classroom experience plus a stipend for their involvement. This year the daily lessons were entirely taught and organized by graduate student Mary Riegel who was assisted by undergraduates Erika Blough and Jarad Dick. During the week, campers focused on various problems they may not

otherwise see during their regular math class at school. The camp survey data reflect the positive experience this camp provided for Missoula area middle schoolers. But campers weren't the only ones who came away with having learned something new. Senior Erika Blough enjoyed sharing her love for math with the students through fun games and activities. This experience increased her excitement for entering the teaching field and helped her better learn how to relate to and teach students in the field of math. Elementary education major, Jarad Dick had this to say about his experience,

"I applied for the position because Professor Billstein recommended the position for me. I got more out of the experience than I expected. Before the camp, I thought it was going to be a challenge to control twenty middle schoolers; however, after experiencing math camp, I appreciate middle schoolers much more than I did before. I am an Elementary Education major, and before the camp I was very certain I only wanted to teach 3rd-5th graders. I have worked in upper

elementary classrooms and thought middle school was not going to be a good fit for me. However, after learning how middle schoolers think and problem solve, I am considering middle school as an option for me in the future. Some of the problems the kids would solve blew me away! Every problem, students would come up with several ways to solve it and all the methods worked. It was a rewarding experience and I would do it again if offered the opportunity."



This year would not have been such a huge success without the energy and organization of graduate student Mary Riegel who organized the daily topics and taught the lessons. According to Mary,

"This math camp is exactly the sort of program I would have begged my parents to have let me attend when growing up. One of the major reasons I was interested in participating in Math Camp was that I wanted to be reminded of why I decided to pursue mathematics in the first place: math is FUN! And there is nothing like a group of excited, bright and inquisitive middle school students to do the job of reminding me."

If you'd like to recommend a current UM math student for a math camp position for 2012, contact Bonnie Spence at ext. 4808. Applications are taken in April and the camp is held the first week of August.

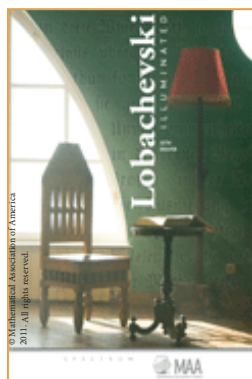
Jon Graham Wins Distinguished Teaching Award

By John Bardsley

Professor Jon Graham of the Mathematical Sciences Department won the UM Distinguished Teaching Award for the 2010-11 academic year. The Distinguished Teaching Award is given out to one UM professor each year and is extremely competitive, making its recipients the 'best-of-the-best' teachers at UM. The impact of Jon's teaching reaches far beyond the classroom: from his meticulous, LaTeXed course notes used by other UM-Math faculty; to the high standards he sets for his teaching, which rub off on his colleagues; to the myriad students he has trained over the years, working them hard and himself even harder; to his efforts with students from UM-Biology (teaching and consulting) which won him the Wildlife Conservation Award in 2008 for the education of UM Wildlife Biology students. Indeed, it's hard to imagine a more deserving recipient. Congratulations, Jon!



This is Jon Graham in the Andes, high above the town of Coyhaique in Patagonia, Chile in November of 2010, where he went for sabbatical.



Former Student Publishes book with the MAA

By Greg St. George

Lobachevski Illuminated is the new book by Seth Braver, published as an eBook in the MAA's 'Spectrum' series. Seth, who received his Ph.D. in 2007, says that the eBook format was not the original plan. While primarily a treatise on Lobachevski's development of hyperbolic geometry, Seth's book contains a new translation of Lobachevski's 'Theory of Parallels' (1840). In Seth's text, Lobachevski's words are set in a red type to set them apart from Seth's commentary. "In brief, the MAA made a total hash of the book when they initially typeset it," Seth laments. "In particular, it was impossible to tell where Lobachevski's

"...Much was gained, but something of great psychological importance was also lost in the process. The tidy forms into which the subject had been pressed scarcely resembled the majestic full-blooded animal that Lobachevski and Bolyai had each beheld, alone, in the deep dark wild wood.

Today, in 2011, the vigorous beast is almost never seen in its original habitat. Just as we give toy dinosaurs and plushy lions to children, we give harmless non-Euclidean toys, such as the popular Poincaré disc model, to mathematics majors. We take advanced students to the zoo of differential geometry and while we are there we pause – briefly of course – to point out the captive specimen of hyperbolic geometry, sullenly pacing behind bars of constant negative curvature." - Seth Braver

words ended, and where mine began. It was so atrocious that I told them that I would sooner withdraw the book than let them publish it as they intended." Fortunately, the eBook format allowed an armistice, and so Seth's prose, "granting readers a vision of the mysterious and beautiful world of non-Euclidean geometry", was able to see the light of electrons. The work, which is an enhancement of his original thesis written under Karel Stroethoff and Greg St. George, is also available in a printed version from Cambridge U. Press in Europe. As the review summarizes, "his achievement is first rate and it is equalled by his eloquently inspiring literary style" (reviewer P. Ruane). Seth was rather famous, while at UM, for teaching a version of Contemporary Mathematics which used Euclid as a text. However unorthodox and iconoclastic the content, his teaching was so inspiring that he went on to win the University's Graduate Student Teaching award. After graduating from UM, Seth went on to teach at St. Johns in New Mexico for two years. He is currently back in the Northwest and teaching at South Puget Sound Community College in Olympia Washington.

A Glimpse of East China Normal University

By Solomon W. Harrar

I was on an International-Faculty Exchange leave for the 2010/2011 academic year to spend the fall semester at East China Normal University (Shanghai, China) and the spring semester at Addis Ababa University (Addis Ababa, Ethiopia). My wife (Sosena) came along on these expeditions. In this article, I will give a brief account of our experience in China and will return to the Ethiopian experience in a separate article in a later issue.

We hit Shanghai amid days of record-high temperature and humidity (high for the day 102°F and 90%, respectively). It was right in the middle of August, the warmest month of the year. Located in the middle portion of the eastern coastline of China, Shanghai is home to 23 million people. The road traffic, massive number of pedestrians and roadside businesses all contribute to the commotion and chaos in the city. Incidentally, Shanghai has seen a noticeable expansion and development since my last visit in summer of 2007. The addition of three new subway lines, many highways (some of them elevated) and many architecturally - as well as structurally - fancy high rise buildings have definitely enhanced Shanghai's capacity to host the 2010 world expo.



Pictured with the China Pavilion at the World Expo 2010

After a week's stay in a university-owned hotel in the old (Putuo) campus of East China Normal University (ECNU), the most crowded and busiest campus I have ever been on, we were ready for the move to the Minhang Campus, situated in the more Missoula-looking southwestern suburban district of Shanghai. Minhang is about an hour's subway ride from downtown Shanghai. It is primarily a residential district but it seems to be slowly turning into the new university and industrial district. Two of Shanghai's biggest universities and several of its giant corporations have newer campuses here. ECNU takes pride in the beauty of its Minhang campus by calling itself the "Garden University".

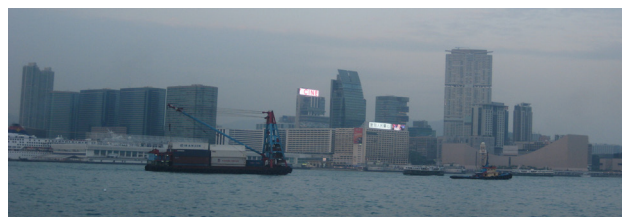
Established in the early 1950s as a pedagogical university, ECNU enrolls a total of over 30K students annually in its 18 colleges, split over the two campuses, with a graduate to undergraduate student ratio of 1:7. As one of the oldest PhD granting institutes in the nation, ECNU has well over one hundred degree granting programs. My affiliation was with the School of Finance and Statistics where I conducted research with my collaborator Prof. Jin Xu and taught a graduate course in Multivariate Statistics. The students in my class had

strikingly-similar mathematical and statistical backgrounds, although all but one earned his or her undergraduate degrees elsewhere in China. Another striking feature of this class was the uniform gender composition. It seems to be the tradition of the department to schedule classes in such a way that they meet three times in two weeks for a total of 4 and half hours. This seems to allow faculty to use their time efficiently. Students hold up well with long lectures. Their semester stretches for 20 weeks from early September to later part of January. I arranged my class to meet once a week for 18 weeks. In the end, grades are assigned on a 100-point scale as opposed to the more common letter grade form. The numeric scores do not quite translate to the standard letter-grading scale in the sense that anything above 60% is considered a pass even for graduate classes.



Group picture with Multivariate Statistics Students

Sundays were our out-of-campus days. Among others, we would go out to Shanghai to explore the attractions the city has to offer. For the longer holidays, we took short (varying in length from hours to a couple of days) trips to Hangzhou, a few ancient towns, The Great Canyon of West Zhejiang, Guangzhou (host of the 2010 Asian Games) and Hong Kong. Some of these places, located in different provinces, have noticeable distinctions in their dietary culture, lifestyle and, of course, level of development. A latitude span of 23½°N - 45½°N explains the climatic difference between southern and northern parts of China. The dietary menus seem to change accordingly, but I am not quite sure if they follow geographic lines. Speaking of the menus, even in smaller restaurants in Shanghai and other cities of China we have been to, they typically span several pages and most of the foods are served hot and with an amazingly-short waiting time. Hong Kong, by and large, has the flavor of a western city. Arguably, the city's design, technology, cost of living and even the way things operate parallel that of the big cities of the US. Although part of the reason for this is clear, one thing is evident: the expression "one country-two systems" will continue to be an accurate characterization for many more years.



Victoria Harbor in Hong Kong

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The Department of Mathematical Sciences increasingly relies on donations to support its activities. With tuition increases continuing to outpace inflation, scholarships are vitally important. Scholarship and other existing funds that help to meet some of the educational needs of the department and our students are:

Joseph Hashisaki Fund - an endowed scholarship for one or two upper-class math majors based on academic achievement

Mac Johnson Family Fund - endowed scholarships for undergraduate students showing promise in mathematics;

George and Dorothy Bryan Endowment - an endowment established by their sons John and Charles in support of undergraduate and graduate students;

Lenes Fund - an endowment to provide funds for the Lenes Exam;

Colloquium Fund - an endowment to provide funds to bring in visiting speakers.

Please consider a gift to one of these funds or to the Math Department's Excellence Fund to be used where the need is greatest.

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Emma Celebrates 100th Birthday

University alumna Emma Lommasson celebrated her 100th birthday Dec. 10 with a party hosted by the University of Montana.

Many gathered to celebrate her years of service and dedication to the University and the community. In lieu of gifts, she was honored with donations to the Emma B. Lommasson Scholarship.

Lommasson studied mathematics and graduated in 1933. After that, she served as a staff member, registrar and teacher. She served as an assistant to University President N.J. Lennes. In 2001, President Dennison renamed The Lodge the Emma B. Lommasson Center in her honor.



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