BAYLOR   {mathematics}

A Message from the Chair

Departmental Happenings

Greetings to all of our 1200+ math alumni! I hope that this message finds each of you well.

We have <u>lots</u> of exciting events lined up in the department for 2012-2013 and we would love it if you could join us for some of these events. We have several top-quality mathematicians visiting Baylor University during the fall and spring semesters. Of course, bringing in these mathematicians has many immediate benefits. Our students have the opportunity to see cutting edge ideas and results from the world's best mathematicians who, in turn, get to see how well our department is progressing on its path to Tier One status. All of this helps significantly in our recruiting of the best possible students and faculty.

> ### HOMECOMING MATH RECEPTION NOVEMBER 3
>
> **Please join us at our annual Homecoming breakfast reception on the first floor of Sid Rich on Saturday from 10am - noon. We would love to see you and your family!**

On September 20-21, we kicked off our special departmental lectures with a 'double event' to a packed audience of students, faculty, and guests from our community. Dr. Tom Banchoff, an internationally recognized geometer from Brown University, and Dano Johnson, a successful director and animator, visited our department. Dano introduced the Baylor premiere of his recently released movie, 'Flatland [2] Sphereland', the much anticipated sequel of his 2007 hit, 'Flatland: the Movie'. Prior to showing the movie Dr. Banchoff gave a public lecture discussing the mathematics behind the movie.

Lance Littlejohn

On October 2-5, Dr. Keith Devlin, an award-winning mathematician and author from Stanford University, known to many as National Public Radio's "Math Guy", will be the fifth speaker in the Baylor Undergraduate Lecture Series in Mathematics. Keith gave two lectures in the department during his visit; his public lecture "Leonardo Fibonacci and Steve Jobs" was based on two of his latest books.

Sam Vandervelde, a well-known number theorist from St. Lawrence University and the creator of the successful Mandelbrot Competition (a mathematics contest taken by more than 6000 students in the US last year) visited the department from October 10-13. Sam's visit will have a dual purpose: in addition to consulting with us on his contest successes, he will also present a lecture, aimed towards undergraduate students, entitled "Where is the Middle of a Fibonacci Sequence?"

Teaching and research continue to excel in our department. Last year, we shattered a record by teaching more than 6000 Baylor students (actually the figure was closer to 6200) on campus. This is significant and indicates more science-oriented students attending Baylor. I have always been impressed with the dedication that our faculty and graduate students have shown in their teaching duties. Baylor has always had a terrific reputation for being a strong teaching institution. Now, as we move towards earning a similar reputation for research, it is important that excellence in teaching remains a priority. In research, the mathematics faculty continues to do a terrific job of scholarly production. During the past calendar year, our faculty wrote an impressive total of 57 articles in various mathematics journals; again, this is a new record for our department!

We are thrilled with the results of our three faculty searches this spring. We hired Dr. Robert Kirby, a numerical and computational mathematician, who has spent the past 6 years at Texas Tech University. Rob, who will join us as a tenured Associate Professor, earned his Ph.D. in mathematics from Texas in 2000; previous to his appointment at Texas Tech, Rob was a Dickson Instructor at the University of Chicago. Dr. Constanze Liaw, who finished up a successful three year post-doctoral position at Texas A&M University, joins us as an Assistant Professor. Conni, a native of Germany, earned her Ph.D. degree at Brown University in 2008. She works in harmonic analysis and mathematical physics. We are also pleased that Dr. Jonathan Meddaugh, a topologist, will join our department as our newest post-doc. Jonathan earned his B.S. degree at Baylor and recently finished his Ph.D. degree at Tulane University in 2011.

Baylor Athletics….and Mathematics?

This past academic year at Baylor University certainly deserves the title "The Year of the Bear"! What a performance by our athletes and coaches during this past season! In football, men's and women's basketball, and baseball, Baylor won a combined 129 games, shattering the previous national record of 123 victories set previously by the University of Texas. Our women's basketball team finished the season with a perfect 40-0 record (setting a new national record for wins in a season), culminating in the National championship. Brittney Griner won several conference and national awards, including both AP National Player of the Year, AP All-American honors, the Wade Trophy, the Wooden Award, the Naismith Trophy, as well as the Honda Cup Award for Collegiate Player of the Year. Baylor women's basketball coach Kim Mulkey was named the National Coach of the Year. In football, the men had a record-breaking year ending in a big bowl win; of course, Robert Griffin III won the coveted Heisman Trophy, the Davey O'Brien Award, and National Player of the Year honors for his extraordinary season before moving onto instant success in the NFL. Men's basketball started the season by winning their first 18 games and making it to the Elite Eight in the NCAA tournament. The women's Equestrian team won the NCAA Hunter Seat national championship. Baylor baseball won 24 games in a row as well as the Big 12 title - and literally came within inches of making it to the College World Series. All 19 varsity sports made it to the post season, an unbelievable feat in today's ultra-competitive college sports scene; in fact, Baylor is one of only two universities in the country that can make this claim. ESPN noted recently that Baylor had "*one of the greatest combined athletic seasons in NCAA history*".

So….our athletes shined brightly on the fields and courts setting multiple records. How did they do in the classroom? It should come as no surprise that they broke some records in this category too! A school record 630 student-athletes were named to the Big 12's 2011-12 Commissioner's Honor Roll while a Baylor record 149 student athletes earned All-Big 12 Academic All American honors and a record 252 were named to the Baylor's Dean's List. Baylor also had eight Capital One Academic All-District honorees in four sports, including five who went on to earn 2011-12 Academic All American honors and one NCAA Elite 88 academic award winner. The cumulative GPA for all 19 varsity sports at the end of the spring

semester this year was an impressive 3.14….so the next time you think of the number π, remember that this was (almost) the GPA for all our athletes this year! Pretty impressive!

A Plea and a Pledge

What point am I trying to make with these references to Baylor sports and Baylor athletes…when I am a mathematician? Well, I would like to see our department earn the national reputation that our Baylor athletic program has earned. We have hired very well in the department and we need to continue along our current path to reach national and international prominence. But, like every top mathematics program in the country without exception, we need significant help from our alumni. We cannot achieve our goals without your help! With your help, we promise to build a top-ranked mathematics program at Baylor.

Here are my department's development goals; each is an expensive investment but the benefits to Baylor and our students would be immediate and everlasting.

(1) obtain three fully endowed named chairs in the department by 2015. This is absolutely essential for us to compete with the top mathematics programs in the country. Every top mathematics department in the country has several endowed chairs which are filled by world-class mathematicians. Hiring well-established mathematicians would help us significantly to increase our profile and recognition in the United States and the world. The department could make a significant leap forward if we had endowed chairs available to attract established, world-renowned teachers and researchers. Of course, our students stand to immediately gain from their added presence. The caliber of students – both undergraduate and graduate – would increase, too, if we can attract the world's best to Baylor.
(2) increase the number of mathematics scholarships in the department; the number of deserving undergraduate students always far outnumbers the scholarships that our department has to offer. Information on current scholarships in our department can be found at our Mathematics Scholarships page.
(3) endow several graduate assistantships in the department; this would give us the opportunity to be more competitive with other universities and allow us to nationalize and internationalize our applicant pool.
(4) endow several visiting professorships in the department. Baylor mathematics faculty can benefit greatly by inviting research scholars and exceptional teachers from other institutions to visit our department for a semester or an academic year.

If you would like to help in any of these areas, please contact me at Lance_Littlejohn@baylor.edu or call at (254) 710-3165. Alternatively, you can contact Dean Lee Nordt (Lee_Nordt@baylor.edu), or either Frank Shannon (Frank_Shannon@baylor.edu) or Rose Youngblood (Rose_Youngblood@baylor.edu) in university development.

Please keep in touch with us – better still, come and visit us! I would love to visit with you! How about a visit during Homecoming this year?

Best wishes,

Lance

Mathematics Scholarship Recipients

The Mathematics Department awarded $120,545 in scholarships to mathematics students for the upcoming academic year. The following Baylor students received this scholarship support. We are very grateful to the families that endowed these scholarships and we wish each of the chosen students continued success in the coming year!

The John C. Lattimore Mathematics Scholarship Fund: Kelsey Carpenter, Yuelin Lu, Tongyao Wang

The Earl, Maxine, Max, and Anita Bodine Mathematics Scholarship Fund: Mason Everett, Jacob O'Bott, Allison Smith, Adam Telatovich, Peter Vanderbeek

The K. L. and Vivian Carter Mathematics Scholarship Fund: Drew Allmon, Ben Larson, Purvi Prajaparti, Ashleyanne Thornhill, Jaclynne Torres

The Jerry Johnson Mathematics Scholarship Fund: Evan Bauer, Yuelin Lu, Kim Woodsum

The Howard L. Rolf Mathematics Scholarship Fund: Kelsey Carpenter

The Hickey Mathematics Scholarship: Evan Bauer

The Piziak Mathematics Scholarship Fund: Kelsey Carpenter

The Roy Donald Perry Memorial Endowed Scholarship Fund: Chrystal Rogers

The Professor Albert Boggess Mathematics Scholarship Fund: Caitlyn Thelen

The Ruth and Gene Royer Mathematics Scholarship Fund: Ryan Cowan, Chrystal Rogers, Ryan Warnick, Lauralee Welch

The Schultz-Werba Mathematics Scholarship Fund: Rachel Carter, Brenna Cole, Alexa Samuel

The Brian Family Scholarship: Chrystal Rogers, Ashleyanne Thornhill

The department solicits applications each March for the following year's scholarships. Students may pick up an application form in the Mathematics office (SR 317). For more information concerning scholarships, students may contact Brian Raines at brian_raines@baylor.edu or call him at 710-4382.

Department News

Judy Dees

We are very sad to report that Donald Dees, the husband of Judy Dees, our Department's Office Manager, passed away on March 30, 2012. Donald was born in Purdon, Texas, on November 10, 1937. Before retiring in 1993, he had worked at Owens Illinois Glass for 37 years; he and Judy were married for 37 years. Judy's terrific staff leadership and knowledge in the everyday running of the department are much appreciated by all of our faculty. Judy, and her family, are doing well and coping as well as they can with their devastating loss.

Johnny Henderson in the Inaugural Class of AMS Fellows

Dr. Johnny Henderson, Distinguished Professor of Mathematics, was selected in the inaugural class of AMS Fellows, a new program initiated by the American Mathematical Society to honor those mathematicians who are "recognized by their peers as distinguished for their contributions to the profession". MathSciNet, the AMS publication database, currently lists 336 papers written by Johnny. Moreover, Johnny's research publications have been cited more than 2000 times and by more than 700 mathematicians. Ten of the department's 26 Ph.D. graduates (since 2002) have been supervised by Johnny. Moreover, he is a dedicated, and immensely popular, teacher with our undergraduate students. Congratulations, Johnny, on this well-earned, and well-deserved, honor!

New Mathematics Club, MÖBIUS, Begins at Baylor

Baylor mathematics faculty members, Steve Cates and Scott Wilde, have been instrumental in starting a new mathematics club, MÖBIUS, at Baylor. Both Cates and Wilde are co-faculty advisors for this club. And, for the first time ever, Baylor students voted for executive officers for this new organization. There was a tie for President so Isai Chavarri and Rachel Shifflet will share the presidential duties. Thomas Gibson is the Vice President, Fontagne Stutzman is the Secretary, Billy Harrell is the Treasurer and Chase Sydow will be the club's Webmaster. What's first up on the agenda for the Executive Board? It is to apply for chartered club membership at Baylor.

Department Welcomes Fulbright Scholar from Tunisia

Professor Jalel Atia, from the University of Gabes in Tunisia, was awarded a Fulbright Scholarship to spend the fall semester working at Baylor with Lance Littlejohn. Dr. Atia is an expert in orthogonal polynomials, approximation theory, and the theory of moments. We are thrilled to have Jalel, his wife Monia, and their four children Sadok, Mohamed Awwab, Ilyab, and Saba.

Tim Sheng and His Extensive Mathematics Travels: If Today is Tuesday, Then It Must Be....Macau?

Dr. Qin (Tim) Sheng, professor of mathematics, has to be one of the most traveled mathematicians in the country. Tim has held an Air Force Research grant for seven years and, with this grant, travels frequently to Wright-Patterson Air Force base in Dayton, Ohio and Washington, DC working on various projects in computational optics. This past summer saw Tim visit several universities in the Far East, including the University of Macau, Hong Kong Baptist University, the National University of Singapore, and Sun Yat-Shan University in China. Tim attended workshops and gave several colloquia during his visits.

Jon Harrison Spends Sabbatical Abroad

Dr. Jon Harrison spent the spring and summer semesters on research leave at Bristol University, UK. The research leave followed up on the discovery, with collaborators in Bristol, of new types of quantum statistics on networks that expand the Boson or Fermion statistics for particles in three dimensions. These results were discussed recently at a Royal Society conference at Chicherley Hall, UK and a network meeting in Bilbao, Spain.

Jonatan Lenells Continues His Collaboration with Cambridge Mathematicians

For each of the past three years, Dr. Jonatan Lenells, Assistant Professor of Mathematics, spent the summer months working with mathematician Professor A. S. Fokas at Cambridge University. Jonatan is part of a large grant from the UK funding agency EPSRC. This summer, Lenells and Fokas discovered

new solutions to an important class of boundary value problems. Now that he is back at Baylor, Jonatan is enjoying the close interaction with students and the opportunity to serve on the Cross Cultural Ministry Team as part of Baylor's Spiritual Life department.

New Graduate Students Join Mathematics Ph.D. Program

Five new graduate students joined our graduate program this semester. We are very pleased to welcome Josh Padgett, Jordan Courtemanche, Tiffany Jones, John Osborn, and Brian Brennan to our Ph.D. program!

Former Baylor Mathematics Student Earns Prestigious AMS Award

Evelyn Lamb

Evelyn Lamb (B.S. Math, Baylor, 2005) has been awarded the 2012 American Mathematical Society's AAAS Mass Media Fellowship. Evelyn is a Ph.D. student in mathematics at Rice University and will work at *Scientific American* for ten weeks this summer.

The Mass Media Science & Engineering Fellowship is organized by the American Association for the Advancement of Science (AAAS). It is a very competitive program designed to improve public understanding of science and technology by placing advanced science, mathematics and engineering students in newsrooms nationwide. Fellows work with media professionals to improve their communication skills and increase their understanding of the editorial process by which events and ideas become news.

This program is available to college or university students (in their senior year, or in any graduate or post-graduate level) in the natural, physical, health, engineering, computer or social sciences or mathematics with outstanding written and oral communication skills and a strong interest in learning about the media. The program has supported over 500 fellows over 30 years.

Record Number of Mathematics and Mathematics Education Majors

The Department of Mathematics now has 98 majors in its three flagship undergraduate degree programs. Together with 53 mathematics education majors, this gives a total of 151 mathematics majors in the department, the highest total in recent memory. The department is hoping to increase these numbers even more in the coming years.

New Faculty Members

The department is pleased to announce the following five new members of our faculty family.

Dr. Robert Kirby joins the faculty as an Associate Professor; he joins us from Texas Tech University where he had been a faculty member since 2006. Rob, who graduated from the University of Texas-Austin in 2000, began his professional mathematical career at the University of Chicago, where he was a Dickson Instructor and an Assistant Professor from 2000-2006.

Rob works in numerical and computational mathematics; specifically, he is interested in finite

elements for partial differential equations, preconditioners for multiphysics problems, mathematical software, multicore computing. Rob currently has a $270K grant from the National Science Foundation. Rob, and his wife Kara, are the parents of four children, Elizabeth, Bronwen, Caedmon, and Ransom.

Dr. Constanze Liaw is a new Assistant Professor in the Department of Mathematics. She joins us after a three-year post doctoral visiting professorship at Texas A&M University. Conni earned her Ph.D. from Brown University in 2008 after coming to the US from Germany, where she studied at Universität Stuttgart.

Conni works in harmonic analysis, spectral theory, and mathematical physics. She is the current recipient of a three-year grant from the National Science Foundation. She and her husband, Joe, have two children, Joanna and Calvin.

Dr. Jonathan Meddaugh is our new post-doctoral visiting professor in the department. Jonathan joins us from Tulane University, where he earned his Ph.D. degree in 2011. Jonathan is a 2004 graduate of Baylor University so it is exciting that he returns to our department. Jonathan works in dynamical systems and continuum theory and the interplay between these two areas. Jonathan is a significant addition to our topology and plans to conduct work with both Dr. David Ryden and Dr. Brian Raines.

Dr. Kyunglim Nam is a new part-time lecturer in our department. Kyunglim earned her Ph.D. in mathematics, in applied mathematics, from the University of Georgia in 2005. She obtained her BS degree from Suwon University in 1994 and her MS degree from Yonsei University in 1997.

Dr. Nam is married to faculty member, Markus Hunziker, and they are the parents of two children, Toby and Hana. We're thrilled to have you on board, Kyunglim!

Dr. Pedro Morales is a new part-time lecturer in our department. Pedro earned his Ph.D. degree from Baylor University in 2012, under the direction of Dr. Klaus Kirsten. Pedro works in mathematical physics. After graduating in applied mathematics and electrical engineering from the Universidad de San Carlos de Guatemala, Pedro chose to come to Baylor, on advice from his Guatemalan friend and fellow Baylor mathematics graduate student, Jose Franco.

Pedro is an exceptional problem solver in mathematics; in fact, Pedro's abilities as a problem solver were noticed during his high school days in Guatemala. As a result, he has participated in three International Mathematical Olympiads (IMO). For the past couple of years, he has helped coach both the Guatemalan IMO team and their International Mathematical Competition (IMC) teams. One of his protégés, Esteban Arreaga, won a silver medal at the recent IMC in the Netherlands while another student, Alejandro Vargas, won a silver medal at the IMO in Bulgaria last August. We're thrilled to keep Pedro, and his multiple talents, for another year at Baylor.

Undergraduate Profiles

Westin King

Westin King is a senior University Scholars student at Baylor with a concentration in mathematics.

Westin King: My father was a math major and teacher, so I grew up learning various concepts, such as negative numbers and binary, several years before I was taught them in school. I always enjoyed math, partially because I was good at it, though during high school I never truly considered math as a potential career path. I wanted to be a medical doctor. I was good at both biology and chemistry and I wanted to help people. Baylor's strong science program and the outstanding acceptance rate into medical school that the University Scholars program boasts drew me to apply.

I travelled to Maastricht, in the Netherlands, during the fall semester of my sophomore year on Baylor's pre-med trip. There, I realized that being a medical doctor was not right for me and that I missed the excitement and satisfaction I felt when I completed a difficult math problem. I switched my major to mathematics at the start of the following semester and I have been playing "catch up" in math classes for the past year.

Despite being slightly behind in math courses, I have had some opportunities for research experience. I worked at Texas A&M University using Fourier and Wavelet analyses to write a program that could recognize guitar chords the summer before my junior year. This last summer, I took a graduate course in linear algebra and an advanced analysis course in order to prepare myself for graduate school. Hopefully, I will be working this year with a new faculty member, Dr. Constanze Liaw, on a mathematical investigation of the Anderson Localization Conjecture, a problem that is believed to be solved by physicists, but still lacks a mathematical proof.

I have found the math faculty to be wonderfully helpful with everything from confusion over a concept to advice for graduate school. I am especially grateful for the time, effort, and advice that Dr. Arnold and Dr. Littlejohn have given to me since I have become a math major. For the future, I plan on attending graduate school and earning my Ph. D. I am undecided on where I would like to work afterwards, or even what field I would like to specialize in during graduate school, but these will come with time.

Ryan Warnick is a senior mathematics major at Baylor.

Ryan Warnick: I did not start college with an interest in mathematics. I had not taken any calculus classes in high school, and when I began college I wanted to study chemistry. However, when I took my first calculus class I fell in love with it, and I thought that studying mathematics might be more interesting. This turned out to be a great decision, and studying both the more practical math as well as the abstract side has been a good experience for me. It has opened me up to a way of looking at things that I had not considered before and given me a new appreciation for logic and reason. This is in part due to the great faculty in the math department, who are always supportive and willing to help out whenever you need it. They are always happy to talk about mathematical ideas; this piques my interest in new areas to study and sheds light on the concepts I thought I had already understood. The great environment for studying

mathematics has fostered my passion in the material, and I'm grateful to the department for introducing me to the subject.

Ryan Warnick

Attending Baylor has also opened my eyes to the role that faith can play in academics. I came to Baylor mainly for the scholarship opportunities, and the Christian community of the campus was not a primary factor. However, interacting with the students and professors here has changed my outlook on the place of faith in both academics. The humility and work ethic shine through in the students and professors at Baylor, and this has shown me that faith can support and enhance the academic experience. Dr. Beauregard, especially, in his willingness to highlight his own evolution with respect to faith, was influential in changing my perspective in his area.

Over the summer I have been working with Dr. Kahle in the Statistics Department; programming tutorial applets for the statistics students. Figuring out how best to express a concept in a tutorial has shown me how many ways there are to look at an idea, and has highlighted some of the weaknesses in my own intuition. At the end of the summer I will be giving a presentation on the work, which I hope goes well, and then we can start publishing the programs for use by the statistics students. I hope that the statistics students find that these applets offer something to them in their studies.

This is my last year at Baylor, and I would like go to graduate school in statistics to study machine learning. However, I am still open to the possibility of going to graduate school to study mathematics. Whichever option I choose, I feel like studying mathematics at Baylor was a great decision, and I'm thankful to have had the opportunity to be here.

Profiles of Current Mathematics Graduate Students

Jordan Alexander: Growing up as the son of a math teacher, who also happened to be a great father, I studied a lot of math at home. To me it was more like playing games with my dad – he coached me in baseball, in soccer, in football, in basketball, and he coached me in math. I truly delighted in learning new mathematical techniques and in pleasing my dad.

Jordan with his wife Reiko

Of course, all through elementary school I had an edge over my peers in math. I was pretty competitive, and I think being able to outperform other students gave me pleasure and drove me to work harder. But outperforming other people only brings so much satisfaction, and over time I stopped enjoying it as much. I still worked diligently and performed well, but by the time I graduated from Dallas Christian High School, math was just one of many "jobs" I needed to work on throughout the week.

When it came time to decide on a university and on a field of study, my school's career counselor recommended engineering. She said it was a good fit for people who do well in math and science, and she said it made good money. Everyone else I talked to seemed to agree, so that made the decision easy for me – I was going to be an engineer. It seems strange when I think about it now, but no one ever mentioned mathematics as a possible field of study. In fact, at the time I didn't even realize that people still do research in math! Anyway, I began at Oklahoma Christian University as an electrical engineering major, somewhere in the next few years rediscovered my delight in math, and ended up graduating with a B.S. in the subject. But in all my years of study, I had never really developed any relationships with other people who shared my joy in studying upper level math.

Upon coming to Baylor for graduate school, I was quite shocked at the high level of difficulty in my classes. I've taken classes with many of the professors in the math department, and though they've been rigorous, I've honestly enjoyed each professor – even Dr. Sepanski, whose classes were, due to my own lack of preparation, especially painful! I think of Dr. Littlejohn's fluid style of presentation, Dr. Lenells' illuminating drawings, Dr. Dugas' helpful metaphors, Dr. Raines' and Dr. Kirsten's witty interaction with students, Dr. Stanke's attention to detail and genuine care for students, Dr. Beauregard's inspiring joy, and many other traits of the faculty I've enjoyed during my time here. I had heard about the pleasant atmosphere of the department before I came to Baylor, and I found it to be an accurate description. Dr. Sepanski even taught in my place one class period when my wife and I were called to San Antonio for a Permanent Resident Visa interview. Also, getting to know other people who actually enjoy graduate level mathematics has propelled my desire for and enhanced my satisfaction in working in that area. I stumbled through and survived my first year here, and delight in math has been growing in me ever since. What a great place to work! I get to learn extraordinary math with people I (usually) enjoy. Not only that, but I get to explore my favorite area of math, which turns out to be representation theory. I've begun research under Dr. Markus Hunziker, who first introduced rep theory to me as "beautiful math", and I'm enjoying it a lot. It reminds me of the time I used to spend "exploring" out in the woods with my best friend as a kid. It seems like there are so many new things waiting to be found.

Hopefully upon graduating I'll be able to land a job at a university where I can continue to research and teach. However, I know there are many other solid opportunities for people with a PhD in math, and I'm confident that I'll be happy with whatever is given to me. I'm particularly interested in working in Japan, as my wife is Japanese and our desire is to spend a significant amount of time there.

Kelly Fouts: When I was younger, I remember everyone asking what I wanted to be when I grew up. My answer was always the same: I wanted to be a teacher. When I was around seven years old, I wanted to teach Kindergarten. Around ten, I liked the idea of becoming a junior high school teacher. By the time I was twelve years old I had firmly decided that I wanted to be a college professor. Since then that desire has only become stronger.

Kelly Fouts

My father instilled in me the passion for learning. He started teaching me Algebra at age seven, and really pushed me to pursue anything that I enjoyed doing. He always encouraged me with the saying, "If you do what you love, you will never work a day in your life." Dad also constantly reminded me that, "Hard work pays off!" So when I realized at an early age that I wanted to teach Mathematics, he strove to help me learn as much as possible on the subject. In sixth grade, I got my first tutoring job helping a friend with her math homework. I loved the feeling of helping my friend whenever her eyes lit up with understanding. I now get to see that very same light in my students' eyes every time something "clicks" with them.

As you can imagine, knowing what you want to do at the age of twelve makes it much easier to choose a college and decide what classes to take. I also knew I wanted to push my education all the way through to a PhD. I ended up being blessed with the opportunity to get my BA at The Master's College, while working two jobs to pay the bills. While pursuing my MS at California State University, Northridge, I substituted for junior high and high school teachers throughout the local school district. I also taught junior high kids in a summer mathematics program. Once I completed my MS, I took a year off from school to build a teaching resume while I searched for the right PhD program. I was able to get great experience teaching everything from College Algebra to upper division Probability at various colleges.

Currently, I am entering my fourth year as a graduate student at Baylor and enjoying every moment. I have the privilege of working with Dr. Manfred Dugas as I work to complete my dissertation in the field of Algebra. More than anything I look forward to telling my Dad, with a smile, "You were right. Hard work did pay off." For I now enjoy every day that I get to walk into my classroom and lecture about the beauty of mathematics.

Alumni Profiles

Christina Tripp graduated last May from Baylor with her B.S. degree – and a 4.0 GPA - in Mathematics. She is now a Ph.D. student in BioStatistics at Vanderbilt University.

Christina Tripp: I am from Houston, Texas and came to Baylor with the intention of going to Physical Therapy school after graduation. After finishing my freshman year and enduring one too many dissections in Biology lab, I decided to reconsider my major. I believe it was through God's provision that I suddenly had the bright idea to major in math. I loved my math classes in high school, but I honestly didn't know being a math major was an option. Did that mean you just solved word problems all day? Little did I know mathematics is one of the most unique and indescribable subjects. The next three years of math classes were the most challenging I've experienced yet, but also the most rewarding and enlightening. I loved sharing academic pursuits with wonderful professors and kind peers. From Calculus 2 through my final class in Abstract Algebra, I learned so much about our world, both what is known and what remains unknown… and what has been proven *unknowable*!

Christina Tripp

Through my classes in the mathematics department, I grew as an individual and a group member. I have always preferred independent study, but studying such a vast subject made it apparent that reaching out for help is both necessary and beneficial. I will always be thankful for the kind willingness of Baylor's professors to lend their time and resources to help me forge my way through the number jungle (as Dr. Burger would say). I especially appreciate the time given by Dr. Henderson, Dr. Burger, Dr. Beauregard, Dr. Morgan, and Dr. Sepanski in the mathematics department, and Dr. Jeanne Hill in the statistics department. I made countless visits during office hours, and their patient guidance will remain greatly valued in my memory!

Statistics courses piqued my interest in applying mathematical principles to an endless variety of research questions. Since I have always been particularly curious about the human body, I applied to Biostatistics graduate programs. I am one of four students accepted into the PhD program at Vanderbilt University. I'm blessed to have the opportunity to continue my education and learn from researchers in other disciplines. I hope to become a statistician who unearths valuable information about human health, and a professor who contributes her knowledge to future students.

In my free time, I enjoy experimenting in the kitchen, exercising outdoors, and traveling. Some of my loftier life goals include opening a bakery, working as a yoga instructor, and trekking to Machu Picchu!

Curtis Kunkel graduated with his Ph.D. degree in mathematics in 2007 under the direction of Dr. Johnny Henderson. Curtis accepted a position at the University of Tennessee at Martin in 2007. This past spring, Curtis was promoted to Associate Professor in the Department of Mathematics at UTM. Congrats, Curtis!

Curtis Kunkel

<u>Curtis Kunkel</u>: Twenty years ago, I would have declared that my dream job was to become a professional golfer, tour the world, make money, and enjoy life. My reality ambition was to become a high school golf coach so that I could have every summer off to play golf all day. A much more attainable goal but perhaps it was still a bit self-serving. Needless to say, I was not the most motivated or attentive student. As I entered high school and the curriculum turned to preparing students for college, I learned something rather important. I was good at something most people were afraid of: Mathematics. I really started thinking about what I might be able to do in the real world that would combine mathematics and my second interest, computers.

It really wasn't a question of whether or not I was going to college, it was more a question of where. My parents weren't 4-year college graduates, so there wasn't much of a college following in our house growing up. We had to get a lot of advice from friends, counselors, etc. in choosing where to go, but ultimately my choice to attend the University of Minnesota at Morris came down to how good the campus felt to me. UMM is a liberal arts school and I ended up graduating as a scholar of the college with a Bachelor of Arts in Mathematics and Computer Science. Now, what I had planned to do with that degree was another story entirely. My original intention upon entering college was to teach high school computer science. Therefore, I took many of the introductory education courses and about the time I was ready to take the entrance exam into the education program, I had decided there was no way I would survive in High School. This led me to think about teaching college and what that would entail. Enter the dreaded GRE. Being not the best student of my English and Composition classes, I had a tough time preparing for this exam, but I achieved good enough marks to apply to graduate schools, or so I thought.

Again, my limited college experiences had shown through and I applied to places that I can clearly say now were well beyond my abilities and background. It wasn't until I was presenting my undergraduate research project at the joint meetings in Baltimore (back in 2003) and met some of the Baylor folks, that I again stumbled onto a group of people that seemed to fit. They encouraged me to apply to Baylor as soon as I got back to Minnesota, which I did, and I was then accepted into the young graduate program.

I couldn't be happier with my choice to move to Texas and pursue my graduate degree at Baylor. Not only did I get the chance to work with some exceptional faculty, I was also able to meet my wife in the process. I worked hard and was able to finish my doctorate in 4 years (earning a masters along the way). Now was the time to begin applying for real jobs. There was no question that I wanted a teaching position. I had come to really enjoy helping students in the drop-in labs I worked at both in my undergraduate experience and at Baylor. Research was enjoyable too, but living in a "publish or perish" situation would not suit me. I ended up applying at well over 70 universities, received interviews at the joint meetings with nearly 20 of those, and landed on-campus interviews at 6 universities. Of course, as had been my habit up to this point, I went by feel. I met a math department that was honest, humble, and full of teachers who excel at research. My visit to the University of Tennessee at Martin (third on the line-up of interview dates) was a perfect fit. There was no reason to look further, so I decided then and there that UTM was where I wanted to be (lucky they liked me too).

For the last 5 years I have been enjoying every moment of my decision to move to TN and become a professor at UTM. I have taught a wide variety of courses (college algebra, calculus, differential equations, complex variables, and math modeling just to name a few). I've had the pleasure of working on some grants (see stem.utm.edu/cats to view our College Algebra Tutorials website) and working on

some committees (both at the department level and the university level). I have advised 2 undergraduate students in research related to difference equations. I have also given many different presentations and published multiple articles in a variety of journals. Last year I was given an early promotion and now hold the title of Associate Professor. I know that none of this could be possible without the guidance I received from the Baylor math faculty. They prepared me to lead, follow, and listen. I feel successful in my chosen career.

~~~~~~

Rachel Wilkerson is a 2011 graduate of Baylor's University Scholar program with a concentration in physics and mathematics. Rachel won a Barry M Goldwater Scholarship in 2010 and is currently working on her Master's degree at Warwick University.

Rachel Wilkerson

Rachel Wilkerson: To be perfectly honest, I am not entirely sure I am qualified to write a profile as a mathematics alumna. Despite abundant coursework in math, I technically graduated from Baylor as a University Scholar. I am currently studying for my Master's in Complexity Science at Warwick University. To further confuse the line demarcating math and physics, the administration switched my course from physics so that my final degree will be from mathematics. My love of the mathematical sciences is equal parts practicality of applied sciences and the wonder of pure mathematics.

I came to math accidentally, by way of physics. Someone told me once that burgeoning young physicists often exhibit one of two tendencies: either a predilection for large scale explosions or an irresistible urge to disassemble microwaves. Growing up, I contented myself with professional firework displays, and generally toasters were safe from my prying fingers. Instead I spent my free time painting watercolors, crocheting doilies, and reading voraciously. I learned that I liked patterns of threads, patterns in art, patterns in words. And so, ultimately, I came to study math for the love of patterns.

Math has taken me to Budapest Semesters in Mathematics, where I learned to love cimbalom music, dobos torta, and hypergraph theory. It took me to McDonald Observatory, where I spent summer nights navigating the world's fourth largest telescope across the West Texas skies. It took me to Amsterdam to study graphical causal models at the Netherlands Cancer Institute. Perhaps best of all, it took me to Baylor University, where I made life long friends writing proofs on the white boards in Sid Rich late at night.

Coming from a Baylor family, I resisted the seemingly inevitable green and gold. But when I found myself with unsatisfactory answers regarding my questions about the math coursework at another nameless inferior university, I came to my senses and enrolled at Baylor. Baylor's faculty truly sets it apart from the rest. I never had a course at Baylor that I could not recommend wholeheartedly. Dr. Mathis's illustration of a potato in Calculus III left a lasting impression, as have Dr. Henderson's stories about his favorite number (52) and Dr. Littlejohn's careful lecture on the heat equation in partial differential equations.

Now I find math has taken me to the countryside of England. I'm currently using graph theory and percolation theory to understand and predict patterns in human mobility. The aim of my project is to predict the spread of epidemics using cell phone data. After finishing my Master's this fall, I plan to return to the States for further adventures in math (or maths, as the British insist).

Math Movie Maker Dano Johnson and Brown University Tom Banchoff Visit Baylor

On September 20-21, the Department of Mathematics sponsored an exciting student/faculty event with Brown University mathematician Tom Banchoff and movie maker Dano Johnson. The event was co-sponsored with BURST (Baylor Undergraduate Research in Science and Technology) and MÖBIUS, Baylor's new math club.
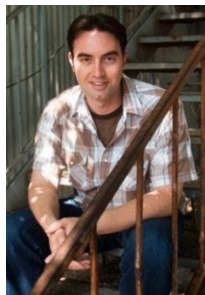
The event began with Dr. Banchoff's lecture "*From 'Flatland' to 'Sphereland' and Beyond*" on September 20. His talk was followed by a public reception with light snacks and refreshments from 5:00-5:45 pm and culminated with Dano introducing the Baylor premiere of his latest movie, "Flatland [2] Sphereland", the much-anticipated sequel to his 2007 hit movie "Flatland: the Movie".

Dr. Banchoff gave his second lecture on Friday, September 21; the title was *Folds, Intersections, and Inflections for Smooth and Polyhedral Surfaces: Distinguishing Cylinders from Möbius Bands*.

Dr. Banchoff earned his Ph.D. degree at the University of California Berkeley in 1964 under the direction of the famed geometer S. S. Chern. He is known for his research in differential geometry in three and four dimensions, for his efforts to develop methods of computer graphics in the early 1990s, and most recently for his pioneering work in methods of undergraduate education utilizing online resources. He has also taught at Harvard University and the University of Amsterdam and held visiting professorships at Yale, Notre Dame, UCLA, Stanford, University of Georgia, and TU-Berlin.

Dr. Banchoff has won several professional and national teaching awards throughout his 45 year distinguished academic career, including the Lester R. Ford Award for excellence in expository writing in 1978, the MAA National Award for Distinguished University Teaching of Mathematics in 1996, and the NSF Director's Award for Distinguished Teaching Scholar in 2004. He has been recognized as both a Pew Scholar and a Carnegie Fellow from the Carnegie Foundation. Dr. Banchoff was President of the Mathematical Association of America from 1999-2000.

Dano Johnson graduated from the University of Texas-Austin in 2000 where he majored in multi-media arts through their Student Television Station. While there, he learned every facet of his profession from writing to post-production. This invaluable education led Dano to success after success. He has worked in the creative development department for Sesame Workship in NYC, he developed educational content for Ignite! Learning, and he is now a partner in his own production company in Austin.

Dano has won an Emmy award as well as many honors at music and film festivals throughout the world. Dano was the director and animator of the acclaimed 2007 film "Flatland: the Movie", based on the 1884 novel by Edwin A. Abbott. His new movie "Flatland[2]: Sphereland" is the much-awaited sequel, based on the 1964 novel by Dutch mathematician Dionys Burger.

Official Movie Poster for Flatland 2: Sphereland

Sam Vandervelde to visit Department this Fall

Dr. Sam Vandervelde, Associate Professor of Mathematics at St. Lawrence University in Canton, NY, visited the Department of Mathematics from October 10-13. Sam works in problems related to number theory, graph theory, combinatorics, and Euclidean geometry. The title of his colloquium lecture, on October 11, was *"Where is the Middle of a Fibonacci Sequence?".*

Sam earned both his M.S. and Ph.D. degrees in mathematics from the University of Chicago in 2004. For his Ph.D., he worked in number theory under the direction of Spencer Bloch. Prior to going to Chicago, Sam earned his B.S. degree from Swarthmore College, where he was Barry M. Goldwater Scholarship winner.

Sam is the owner of Greater Testing Concepts which produces the Mandelbrot Competition, a math competition for high school students that was taken by more than 6000 students this past year.

Sam Vandervelde

Department Welcomes Distinguished Visitors to Speak in Departmental Lecture Series

Besides having a regular colloquium series throughout the year involving visiting mathematicians from around the world, the Department of Mathematics runs three prestigious lecture series that are funded through the Office of the Dean in the College of Arts and Sciences with special thanks to Dean Lee Nordt and to Dean Ken Wilkins. The 2012-2013 academic year features several outstanding mathematicians lecturing in these series. All talks are open to the public; we would especially love to see our alumni at these lectures!

The Baylor Undergraduate Lecture Series in Mathematics

Keith Devlin, National Public Radio's "Math Guy", was the fifth speaker in the Baylor Undergraduate Lecture Series in Mathematics when he visited Baylor University from October 2-5, 2012. As is standard with this lecture series, Keith gave two lectures. His public lecture had the intriguing title *"Leonardo Fibonacci and Steve Jobs"* and was given on October 3 at 4pm in D109 of the Baylor Sciences Building. His second lecture, *"First Person Solvers: Rethinking Mathematics Education in the Video Game Era",* was given on October 4 at 4 pm in SR 344.

Devlin earned his bachelor's degree in mathematics from King's College London and his Ph.D. degree in mathematics from the University of Bristol. He is a consulting Professor of Mathematics at Stanford University, co-founder and Executive Director of Stanford's Human-Sciences and Technologies Advanced Research Institute, co-founder of Stanford's Media X university-industry research partnership program, and a Senior Researcher in Stanford's Center for the Study of Language and Information.

He is the author of 31 books and more than 80 research articles. He is recipient of the Pythagoras Prize, the Peano Prize, the Carl Sagan Award, and the Joint Policy Board for Mathematics Communications Award. In 2003, he was recognized by the California State Assembly for his "innovative work and longtime service in the field of mathematics and its relation to logic and linguistics." His latest research work has focused on the development of new tools and protocols to assist intelligence analysis and the development and use of videogames in mathematics education. Devlin is actively engaged in promoting the public understanding of mathematics and its role in modern society, topics on which he lectures extensively around the world.

Information on his two lectures can be found by going to the department's web site, specifically to the link Baylor Undergraduate Lecture Series in Mathematics.

The Baylor Lecture Series in Mathematics

Gilbert Strang, MathWorks Professor of Mathematics at the Massachusetts Institute of Technology, will be the sixth speaker in the Baylor Lecture Series in Mathematics when he visits Baylor from January 30 – February 2, 2013. Professor Strang's public lecture, "*Random Triangles and Mathematical Videos*", will be delivered on January 31 at 4pm in D109 of the Baylor Sciences Building. His second lecture is entitled "Functions of Difference Matrices are Toeplitz plus Hankel" will be given on February 1 in SR 344. Further information on Dr. Strang's lectures, including abstracts, can be found at the departmental web site Baylor Lecture Series in Mathematics.

Professor Strang returned to his alma mater MIT upon completing his Ph.D. degree from UCLA in 1959 under the direction of Peter Henrici. He received the S.B. from MIT in 1955, and the B.A. and M.A. as a Rhodes Scholar from Oxford University in 1957. He joined the MIT mathematics faculty in 1962, and was promoted to Professor in 1970.

His research focuses on mathematical analysis, linear algebra, and PDEs. He has written textbooks on linear algebra, computational science, finite elements, wavelets, GPS, and calculus. His video lectures are on MIT's OpenCourseWare, and he is on the editorial board of numerous journals, and is the founder of Wellesley-Cambridge Press. His service to the academic community is extensive. Professor Strang served as President of SIAM, 1999-2000, Chair of the Joint Policy Board for Mathematics, 1999, Chair of the U.S. National Committee on Mathematics, 2002, and member of the Abel Prize Committee, 2003-2005. In the Mathematics Department, he was Chair of the Pure Mathematics Committee, 1975-1979.

Professor Strang has received distinctions for his research, service and teaching; among them: the Chauvenet Prize (1976), the SIAM Award for Distinguished Service (2003), the MIT Graduate School Teaching Award (2003), the Von Neumann Prize Medal of the U.S. Association for Computational Mechanics (2005), the MAA Lester R. Ford Prize (2005), the MAA Franklin and Deborah Tepper Haimo Prize (2006), and the Henrici and Su Buchin Prizes of the International Congress of Industrial & Applied Mathematics (2007). Professor Strang is a Member of the National Academy of Sciences and a Fellow of the American Academy of Arts & Sciences. He is an Honorary Fellow of Balliol College, Oxford.

Life Experiences in Mathematics Series

Mike Hosea will deliver the fourth annual Life Experiences in Mathematics lecture when he visits Baylor University on March 21, 2013. The title of Mike's lecture is "*Closing the Mathematical Software Deployment Gap with Automatic Code Generation".* More information on Mike's visit, and lecture, can be obtained by visiting the departmental web site and, in particular, the link Life Experiences in Mathematics Series.

Mike is a numerical specialist with The MathWorks, the company that produces, among other important products, the software packages Matlab and Simulink. Mike graduated with his BS and MS degrees in mathematics from Baylor in, respectively, 1986 and 1988. In 1993, He earned his Ph.D. in numerical analysis from Southern Methodist University under the supervision of well-known numerical analyst Larry Shampine. Mike also earned another MS degree in Operations Research from SMU in 2004.

Prior to his present position at The MathWorks, where he has been since 2004, Mike had considerable experience in both academic and business positions. He was an actuarial assistant at Lewis & Ellis, Inc. From 1988-1992, Mike worked at Texas Instruments developing scheduling algorithms for semiconductor wafer fabs. He was an Assistant Professor of Mathematics at Northern Illinois University from 1993-1996 before returning to Texas Instruments from 1996-2004 as a Software Development Engineer, working on TI calculators and educational software. Mike was awarded two US Patents in connection with this work. He and his wife live in Natick, Massachusetts with their three children.

Keep in Touch!

We want to hear what you are up to and the role that your experience with the Department of Mathematics has played in your ongoing journey. We invite and encourage you to remain active in the life of our department. There are a variety of ways for alumni and friends to be involved.

- Please stay in touch. Our current students welcome information about internships and other opportunities, and students greatly appreciate presentations by alumni and others who talk about their careers and share their insights into the employment landscape. If you are interested in giving a talk to our majors, please contact Lance_Littlejohn@baylor.edu.

- Each of the chairs within the College of Arts and Sciences administers a discretionary fund that directly supports his or her department. If you are interested in contributing to these funds, please contact Lance Littlejohn at Lance_Littlejohn@baylor.edu. Alternatively, you can contact Rose Youngblood at Rose_Youngblood@baylor.edu or Frank Shannon at Frank_Shannon@baylor.edu or in university development.

- As we pursue our goal of becoming one of the nation's top mathematics programs, endowed chairs, lectureships, visiting professorships, and scholarships will play a very important role. If you are interested in supporting the department through an endowed fund or scholarship, please contact Frank Shannon at Frank_Shannon@baylor.edu or Rose_Youngblood@baylor.edu in university development or Dr. Lee Nordt, Dean of the College of Arts and Sciences, at Lee_Nordt@baylor.edu.

Let us know what you are doing and please share your stories with us. We would like to include lots of items for our **Alumni News** section – so please send me (Lance_Littlejohn@baylor.edu) all of your 'alumni newsworthy' snippets! And, of course, if you are in the area, you are always welcome to come by and see us! We always enjoy talking with old friends and former students!