



SOLEDAD BENGURIA-ANDREWS



Associate Professor Brian Street in front of his Math 221 class.

Math 221 Gets a Redesign

Do you remember that first college course where you walked in to find yourself with hundreds of other scared freshman students all staring with anticipation at a lone professor on a stage? For many new UW students, their first college course is one of those giant courses needed for so many prerequisites: Math 221. This is the first course of the Calculus sequence, and it has been taught almost the same way since the beginning of time.

However, experiments with that status quo are underway. Math 112 (Algebra) has been taught using an active teaching model for several years now. The model dictates that students review materials outside of class, then spend that precious hour not listening to lecture and frantically taking notes, but actively working out problems, and responding to the instructor and peers to increase understanding of the material. It has been proven to produce better results in smaller classes, with lots of desks and computers and teaching assistants to mill about, looking to help students with questions.

The university looked at the success of these other classes, then at these larger lecture classes like Math 221 and said, “Why not them?” True, a large lecture class doesn’t lend itself to small group interactions, but there are ways to break

apart the traditional lecture format to provide students more involvement in their own learning. This was the start of the REACH (Redesigning for Active Learning in High-Enrollment Courses) program here at UW, part of the Educational Innovation (EI) Initiative.

Soledad Benguria-Andrews was called upon to act as the Calculus Coordinator and as one of the instructors in this new way of doing things. Together with a team from the EI initiative, they looked closely at how things could be done in a more interactive way. The questions of how to do small group interactions in a lecture hall, or how to get students to take more responsibility for their own learning were carefully considered.

At first, Soledad had her doubts. “In Chile, the professor talks and you listen, you take notes. I was raised and taught that way. I was worried how this would work. I also wasn’t sure how students would respond to the emphasis we placed on the student responsibility aspect.”

The students were told early on that this was a different sort of class—it could mean 10 hours of work per week outside of lecture, and that they were responsible for their own

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A Word from the Chair



Once more the semester and the year ends with all of its chaos, rush, and excitement as we try to finish our tasks, and graduating students reflect on their experiences in Madison. It is my favorite (and most exhausting) part of the year, and having a most beautiful spring truly helps! Every year the arrival of the new season feels like an unexpected miracle.

This new issue of *V³* brings news and stories to provide a sense of what's happened in Van Vleck Hall over the past year, and to highlight some of the members of our Math Department family.

Female faculty members in the department have been getting a lot of attention: our department has one of the highest percentages of female faculty among top research departments in the nation—over 20% this coming fall! The College of Letters & Science ran a story, picked up by campus in the "Inside UW" newsletter, and we include some of the highlights in these pages.

We remain at the forefront of innovation in teaching: the REACH program is an ambitious attempt—funded by the Office of the Provost—to redesign what it means to have an active learning Calculus lecture, even when the room holds 275 students! Our REACH team has done an amazing job, enriching the learning experience of our students and opening the door to what future classes may be like.

We continue to reach out to those outside the university: our

students and faculty had great fun during "Saturday Science." It is hard not to smile when watching the faces of students trying to decipher the mathematics mysteries they encountered during this intellectual marathon with 600 kids. And that's not the only activity where our graduate students shined: *Notices of the American Mathematical Society* ran an AMS seminar article featuring our group, and students have been active on all fronts, including ensuring that our department is a welcoming, open, and supportive community for all.

This year marked 10 years since our last review and the College again evaluated our performance. We passed the test with flying colors, and a main factor in our success is our junior faculty. They have been steadily progressing into tenure and sweeping up awards: seven Sloan and seven CAREER awards in the last 5–6 years—what a fantastic showing! Despite the struggles of recent years, we are in a good place, thanks to the enthusiastic effort of our people, and in no small part to the support of our alumni and friends who have kept our backs during these rocky times. We continue to fire on all cylinders, creating a climate of pride, accomplishment, and ambition. It cannot be done without your support.

I am grateful to head this vibrant and forward-looking department, where so many ideas—mathematical and otherwise—are created. It is my third year as Chair, and the end of my rotation, but I have agreed to extend it a little further. I am looking forward to another incredible year working with this very special group. Please, do come and visit, enjoy our newly remodeled lounge, or simply drop us a note telling us how you are doing. We are always so very happy to hear from you.

On, Wisconsin!

Gloria Mari-Beffa
Department Chair

"Why Math?"



It is rare to have a mathematics major who is also in her first year at UW–Madison, but Isabel Allen knew right away what she wanted to study when she came to campus this past year: "I was the weird quiet math girl; but it is the thing to do!" she exclaimed during her interview. "I took classes here in high school, so I am familiar. But it still feels different. I'm really enjoying

the freedom even though there are so many talks and events it can feel overwhelming."

While she may feel overwhelmed, her actions don't show it. In her first year Isabel waded right into everything our department and university has to offer. She found support by joining the Women in Science and Engineering (WISE) learning community, worked with Dane Morgan in his research lab, and jumped right into advanced undergraduate math courses. "Analysis was intense, but really great." On the other hand, not everything went smoothly for the first year major: "Chemistry was really rough, man. It doesn't seem to follow

as you'd think. There are lots of rules and lots of exceptions!"

Indeed, transitioning to college can be tough, but for Isabel problems rarely do not have solutions: "I really like plants," she says, "and I really like gardens. But there are no gardens here in the winter. So I've been exploring greenhouses!" Isabel plans to stay around town for the summer. So now she will be able to enjoy reading in the Arboretum then among the cacti in Birge Hall.

So why mathematics for Isabel? "I've always enjoyed learning about how things work," she says. This interest was fostered by her parents, though perhaps not in the way they expected. "My dad would make me read these awful physics books," she exclaimed with a wry grin.

In a typical undergraduate spotlight we would take some time to discuss long term plans. But, like most first-year students, the "future" is a long way off for Isabel. "I'm kinda living in the moment right now. But I am looking forward to a potential research opportunity in the department. I'm excited about narrowing my focus, but worried about missing out on cool stuff in other areas." This last comment struck a chord with me. I recall feeling the same thing. Not as an 18-year-old freshman but as a 25-year-old graduate student! So perhaps Isabel is rather unlike the typical freshman student. And perhaps that is what makes her future bright, even if she is not thinking about it. ■

Math Department Completes its 10-year review

This year the Math Department undertook its 10-year program review. Our review provides a time for program faculty to analyze the quality of academic programs, to affirm ways that the program is working well, and to implement improvements, if needed.

This information is used for reports to the Dean, the University Academic Planning Council (UAPC), and the Board of Regents, and meets a requirement for institutional accreditation. We are proud of the submitted report and wish to highlight some items from it.

- The number of mathematics majors has more than doubled since 2007, with a parallel increase in degrees granted. In the last decade, we have instituted a certificate degree that has gone from a dozen students to more than a hundred.
- We have one of the largest graduate programs among our peers: 131 PhD students, who graduate within an average of 5.7 years. Students go on to prestigious postdoctoral positions, teaching faculty jobs, and positions in industry. A recent exit survey showed a high degree of satisfaction among our graduate students.
- We teach over 10% of all credit hours in the College of Letters & Science, and climbing—more than the entire School of Business and almost 75% of the entire College of Engineering. Although a large portion of the increase has come

from service classes, both our graduate and undergraduate programs are also growing fast. Our faculty and academic staff are involved in several teaching initiatives, including the successful revamping of the Calculus lectures into active learning classes (in collaboration with REACH) and the transformation of pre-Calculus classes at WisCEL. The excellence of our teachers has been recognized with two campus-wide teaching awards to our faculty in the last four years.

- We also run multiple outreach programs and initiatives reaching all the corners of the state: our statewide talent search seeks to identify mathematical talent in the state; the Math Circle holds multiple public lectures per semester aimed at middle and high school students and their families, with plans to expand with visits to local high schools; our "Girls Math Night Out!" brings groups of high school young women to campus to work on research-style projects with graduate student mentors; and more.
- We are the youngest department among our peers, with almost half of our professors being 40 years old or younger, and only three professors 60 or above. This results in a vibrant research and teaching atmosphere, with new initiatives and collaborations sprouting every year. Our faculty are among the best in the world, as recognized by the many awards and accolades they receive every year, bringing in almost \$6M in research awards. ■

Alumni Profile

Is there a particular reason you chose to major in mathematics? Looking back, would you have majored in math again?

I would definitely choose to major in mathematics if given the opportunity to revisit my college options. But, I would go at things a little differently. I have always enjoyed math and found it stimulating. It's a game, a language and a mystery all rolled into one. Since I've always been pretty tight with my money, I was delighted to feel that my avocation was a legitimate use of tuition.

That being said, I knew I would never be “a mathematician” since I never felt able to create or consistently innovate with math. Selecting math as my major was actually a decision born out of expediency at the time. I had always taken math courses as a big part of my curriculum. When I began considering going to medical school, I found that my accumulated credits permitted me to fulfill all the necessary requirements and still graduate after four years.

Was there a class or instructor that you particularly enjoyed during your time in Madison?

I will be forever grateful that I had the opportunity to take Topology with Mary Ellen Rudin. She made so much sense and was so approachable for us undergrads despite being such a rock star in the field. Topology reminds me of *Alice Through the Looking Glass*, with how things change and how they stay the same. Dr. Rudin was an excellent guide through that world. She did not suffer fools, and it was refreshing to see a successful woman who did not apologize for that success.

Combinatorics was a highlight, simply because it embodies my love of puzzles. My professor had the most beautiful handwriting. I remember that he was clearly delighted and generous with praise when I came up with a novel proof that he hadn't considered. I will never forget that enthusiasm and support.

How do you feel your instruction in math has helped you in your current job path?

Math has definitely helped me in my medical career. As a surgeon, I found that my ability to visualize in three dimensions came more easily. I can usually think things through in a logical progression, but still have the flexibility to switch paths when circumstances or my patient's needs warrant. I'm able to see trends and patterns. Medicine has attempted to become more quantifiable and “evidence based” during my career, and my math background permits me to interpret research more easily.



Nancy McKinley, MD

What advice would you give to a current math major who is pondering going into a non-academic career field, such as business or medicine?

I remember being a little worried during my first year of medical school, because the only other math major in my class dropped out. I also remember my father questioning what I was going to do with “all that math.”

My advice to a current math major would be to not confuse selection of a major with defining yourself more narrowly. Education is a process and a major is an area of deeper exploration and reflection. Choosing not to make a major your career is not failure or a waste of effort nor is it a rejection of the mentors and peers in that field.

Students are flocking to get STEM degrees, foreseeing great demand for science and mathematics in industry. What other skills or lessons do you think today's students should consider developing in order to succeed not just in a career, but in life?

This question really strikes a chord with me. I still subscribe to universities being a place to explore, to learn how to learn, to grow as a person, to encounter diversity and alternatives and—yes—to have fun. I fear there has been a trend to view a degree as job training or “an ends” and not “a means.”

During college, I remember asking a prominent individual how I could best prepare myself for a career in sports. I felt insulted when the response was to learn how to type. Ironically, now that I am an orthopedic surgeon with a sports medicine interest, I spend a great deal of time using a keyboard for research and documentation! The upshot for me is to listen as much as possible because I never know what might come in handy—either for my work or in relating to others.

The Wisconsin Idea has been around for a long time, emphasizing the connection that the University has to its community, and the state. Can you talk about what the Wisconsin Idea means to you?

I am amazed that The Wisconsin Idea has become controversial. Perhaps I'm naïve in that opinion. While I do recognize that there needs to be accountability, I can't fathom where else society is going to obtain innovation, expertise, and test ideas. The outreach of the University and the Extension service permits access to those resources, allowing rural and low-volume areas to both contribute to and benefit from that knowledge base. In medicine, we are now constrained by benchmark productivity and the obligation to adhere to usual and customary practices. We need the academic centers to be cutting edge and open to disseminating skills, as well as provide an avenue of last resort for difficult or unusual problems. ■

Math 221 continued

engagement and success. This messaging is outside of the typical syllabus expectations; it is a more explicit statement of how to balance the coursework, how to manage time, how lecture engagement would work, and how students could learn self-awareness about their own understanding or lack thereof.

Together with two other instructors (Brian Street and Simon Marshall), Soledad worked to make lectures engaging with two colors of paper, orange and yellow. The instructor might ask if a limit exists in a particular problem, and ask the students to vote with the paper. Or they might do an activity called think-pair-share, where students work out a problem on their own, then pair up with a neighbor and review their results. The orange paper might be used to report a different result than their neighbor, while a yellow paper might be used to indicate similar results. That way, the issue of a wrong answer was less about being the only one in a crowd and more about how different people approach problems differently.

Simon Marshall was excited by this new approach. “(It) worked pretty well. It was nice to get down off the podium and talk to students during class, and the TAs and I together could cover a lot of students. The flash card feedback worked, though it sometimes took a little bit of cajoling to get a response from the full class. I lectured using an iPad, which was much easier to see in Humanities 3650 than the blackboard, and allowed me to post the lecture notes online after class, which the students found useful.”

The improvements didn't stop at the classroom. Shirin Malekpour, Director of the Math's Department's Instructional Excellence Program (IEP), has been working to improve Teaching Assistant training for a while, but the REACH Program gave renewed emphasis on ways to apply teaching skills to new graduate students. She says, “The REACH program helped us emphasize the active learning in the classroom in the discussion sections. One of the first things we did was hire TA Coordinators, who were already familiar with the content and how to teach it, to prepare materials for new TAs teaching Math 221. They also were ready to serve as mentors for new graduate students so they could best engage with their students.” This process was well served by the REACH program and the support of the Math Department Chair, Gloria Mari-Beffa. “Gloria was really a champion to make this happen. Her support helped us devote resources and obtain the expertise we needed,” Malekpour continued.

That expertise came from Kathy O'Connell, an Instructional Technologist with the Division of Information Technology (DoIT). Kathy brought the educational pedagogy needed to analyze the problems and how to tackle them. She'd suggest strategies to implement, and then help adjust the approach to fix problems. Malekpour calls O'Connell a “cheerleader” who helped convince the doubting instructors about the value of this approach. “She brought a different perspective, making sure we kept our eyes on the ball and did not lose interest.”

The emphasis on TA training also involved workshops

on techniques TAs could use in any presentation, including how to communicate effectively even if English was a second language. There is even a future planned “improv” style training to help with being comfortable while presenting. These are skills that will serve TAs far past their time in the classroom.

Shirin Malekpour, Alex Hanhart, Joe Miller, and Soledad Benguria-Andrews developed online content for the course, with the collaboration of Kathy O'Connell and her colleague, Mark Neufeld, also an academic technologist with DoIT. 24 modules were developed to “pre-teach” concepts before the class, and then test for understanding post-class, even taking the place of a traditional syllabus to emphasize the need for real commitment to the course. The online course management system was intended to be a one-stop shop for all students; a place where they could go to get their assignments, as well as communications with their instructors and TAs, and a glimpse into exactly what was happening at any given moment throughout the semester.

Another significant change, spearheaded by O'Connell and Neufeld, was to offer iPad Pros to the instructors to use in their classes. In doing so, they could face the class and see the expressions on the students faces instead of working at the blackboard with their back to the students. After the class, the iPad Pro notes could be uploaded to the course site so students could go back and review any concepts that were unclear. Besides using them for notes and graphing, instructors could pull up the course site during class, link to external sites, or do additional demos or animations.

All of this attention to detail won over the instructors. Benguria-Andrews calls the experience an eye-opener. Students, when told that a particular concept would not be on an exam, still wrestled with the concept and asked questions, trying to understand it. This illustrates that the interest in learning has led to better performances and better engagement. Malekpour notes that there was not a single complaint about TA teaching in the discussion section, a clear improvement over previous years. Simon Marshall found the experience an improvement over teaching other classes of similar size, and will be working to incorporate similar in-class activities in his teaching in the future.

A student evaluation comment illustrates how students bought into the new structure:

“The lectures are well-planned and organized with a pattern of introducing a topic, giving examples, and presenting exercises for students to try applying new concepts. Using different colored cards to hold up in class whether students got the same or different answers than peers is an effective way of gauging students' understanding during lecture.”

Students attended lecture more consistently as well, with 80–85% attending instead of 55–70% in previous years.

Analysis of the after/effects is ongoing, but the instructors are sold on this new method of teaching a very old class. ■

Women in Numbers at Wisconsin

The Mathematics Department is setting a shining example nationally for its female faculty presence. Starting fall 2017, the department will have eleven women on the faculty, making up roughly twenty percent of the faculty. This the highest proportion of women in the department's history, and one of the best among all premier research departments nationwide.

The women are Tullia Dymarz, Mihaela Ifrim, Autumn Kent, Qin Li, Gloria Mari-Beffa, Julie Mitchell, Leslie Smith, Mariya Soskova, Betsy Stovall, Lu Wang, and Melanie Matchett Wood.

Their presence in such numbers gives our students visible proof of women succeeding in math and science. They are world class scholars and share an impressive number of awards, fellowships, and grants. To give just a small sample: four of them hold NSF CAREER awards, one of the most prestigious research grants given by the National Science Foundation; two of them hold Alfred P. Sloan Research Fellowships, prestigious fellowships awarded each year by the Sloan Foundation; one has held a von Neumann fellowship, a one-year fellowship awarded by the Institute for Advanced Study; and all together they have brought in millions of dollars of federal grant funding to Wisconsin throughout their tenure here.

In addition to the research faculty, our department is kept running with the help of many women on the regular and academic staff. Joan Wendt is the Chair's secretary, and Sharon Paulson runs the Copy Center, manages textbooks, and helps with travel. Nibedita Pattnaik keeps the timetable in shape, while Veneta Boyanova manages tricky travel arrangements for faculty and visitors. Kim Marston is our authority in Human Resources, while Elena Ungur manages all of the goings-on administratively. Sara Nagreen smoothes our integrations with technology, and Kathie Brohaugh takes care of our graduate students. Shirin Malekpour and Diane Rivard tackle the logistics of undergraduate courses and training mathematics educators. Women are at the heart of the Mathematics Department in all respects.

Read on for some brief sketches of many of these remarkable women.



Tullia Dymarz (Associate Professor)

Tullia Dymarz says of her early mathematics experience: "I always really enjoyed math in school and my father encouraged this, too. When it came time to fill out my university application I didn't hesitate; I signed up for the honors math program. I don't ever remember making a 'decision' to study math it just seemed like the obvious thing to do for me." And of the benefit of our strong female presence, "None of the math classes I took as an undergraduate or graduate student were ever taught by a woman. I never really thought about the effect this had on me until I attended a workshop where one of the mini courses was taught by a confident and unabashedly feminine woman. I was impressed and inspired. It's nice to know that the students at

UW-Madison will get to experience many female professors. Also when there are only one or two women in a department it's easy for a student to say, 'I'm not like her so maybe I don't belong,' but all of us are so different that I'd like to think there's a role model for everyone."

Dymarz completed her undergraduate degree at the University of Alberta, and did her PhD work at the University of Chicago under the supervision of Benson Farb. After time at MSRI and postdocs at Yale and the Université Paris Sud (Orsay), she joined us as an Assistant Professor in 2011. She holds an NSF CAREER award. Her student Carolyn Abbott will be joining the department at the University of California at Berkeley as a postdoc in the fall.

Dymarz works in geometric group theory, a subject that studies algebraic objects by equipping them with geometric structures which can be examined using the tools of geometry and then translated back into the language of algebra. Her work lies in a particularly difficult area of this subject, concerned with large scale classification theorems and ties to analytic problems. Of her work she tells us, "I love this field because it combines ideas and techniques from many areas of mathematics, and at the end of the day I have a beautiful picture (albeit in my head) of a wild geometry quite different from the one we live in."

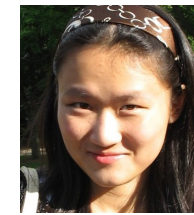


Autumn Kent (Associate Professor)

Autumn Kent was interested primarily in art and literature when she was young, and came to focus on mathematics much later, only deciding on mathematics as a chosen subject in college. In fact she went to college planning to teach high school English, but found geometry and topology too beautiful to abandon. Of the women here, she tells us, "The strong group of women in the department is invaluable to me as a source of mutual support, and things would be difficult if there were fewer women around. We give each other strength. A woman in the Mathematics Department at Wisconsin has more freedom to be a strong voice than she would at many other institutions."

Kent did her undergraduate work in mathematics and literature at the University of North Carolina at Asheville, and her PhD at the University of Texas at Austin under the direction of Cameron Gordon. She held an NSF postdoctoral fellowship and Tamarkin postdoctoral position at Brown University before coming to Wisconsin as an Assistant Professor in 2010. In the 2016-2017 academic year she was a von Neumann Fellow at the Institute for Advanced Study, and holds an NSF CAREER award. Her student Balázs Strenner is a Hale Visiting Assistant Professor at Georgia Tech.

Kent's work touches on many areas of mathematics, bridging geometry, topology, algebra, and analysis, but is unified by an underlying presence of surfaces, their geometric structures, and their symmetries. She is particularly interested in the interaction of algebra and geometry, and bridging divides between seemingly disparate subject areas.



Qin Li (Assistant Professor)

As a child, Qin Li was told that girls would find it more and more difficult to keep high grades in math and physics as they proceeded to higher education. She found that this was not the case, that mathematics suited her naturally, and she enjoyed her successes despite discouragement. For Li, the large number of women at Wisconsin is a welcome change from the loneliness of departments with few to no women. Here there is always someone to talk to.

She completed her undergraduate studies in Tsinghua University in math and physics, received her PhD at UW-Madison under the direction of Shi Jin, and was a postdoctoral scholar at Cal Tech before returning here as an Assistant Professor in 2015. She has received many honors and awards for her research and her teaching.

Li works in applied mathematics, quite literally applying mathematics to industry. She studies the kinetic theory for gas dynamics, using equations to characterize the interaction of gas particles interacting with each other and their surrounding media. This is particularly important in industrial design involving gases including airfoil design (what shape allows the best flow) and rocket propulsion (what kind of gas enhanced by how much electric field gives the airspace the most efficient propulsion).



Shirin Malekpour (Faculty Associate)

Shirin Malekpour did her undergraduate studies at Pomona College, where she was inspired and encouraged to pursue math and education by the instruction of Shahriar Shahriari (the winner of MAA's 2015 Deborah and Franklin Tapper Haimo Award for Distinguished Teaching of Mathematics and a student of Marty Isaacs). "My interest in teacher education came about quite unexpectedly. About 10 years ago the department was short an instructor to teach one of the math 13x courses and I volunteered to teach it—never having taught such a course! Teaching a course about geometry for future teachers for the first time and interacting with my students showed me how important these courses are and how hard and tricky teaching them can be." She adds, "It sounds cheesy, but I truly believe the math content courses for future teachers are the most important courses we teach as a department."

After her undergraduate studies, Malekpour completed her PhD at the University of Maryland, College Park, under the supervision of Michael Laskowski in 2005. Madison was a big change from the Washington, DC, area, and it took a few years for Malekpour to adjust and feel at home. "Having grown up in Tehran and lived in the DC area, I have a soft spot for crowded and bustling metropolises."

In addition to teaching and coordinating the Wisconsin Emerging Scholars program (WES), Malekpour directs the department's Instructional Excellence Program (IEP), which

houses our TA training program. She has built this program from scratch with assistance from a few colleagues and graduate students over the past four years, and it has become a model for other TA training programs in the College of Letters and Science. Malekpour is an integral part of calculus and education at Wisconsin, teaching and training teachers, and redesigning pre-calculus and calculus.

She summarizes well her experience here and the department climate: "I greatly appreciate the opportunities that I have been given by the department to pursue my passions. The department has always been open to the new ideas I've brought them, allowing experimentation and adapting what was shown to work. Friendships I have formed at work and the support network are priceless. I certainly enjoy the friendship of my women colleagues in the department and appreciate their contributions to creating a more inclusive environment. However, our students, both graduate and undergraduate, benefit the most from the high number of women in the department. High representation of women in the department can serve as a reminder that women belong in the STEM areas and they are just as successful as men. The sense of belonging and seeing yourself represented matters."



Sara Nagreen (IT Coordinator)

Sara Nagreen is the department's IT coordinator, having taken over the position in 2012 when Yvonne Nagel retired. Before joining us, she worked with Learning Support Services for nearly fourteen years. She describes this as a big change, and was her first real taste at management. It was the "first time that I started to consider all of the many activities where IT touched mathematics instruction, administration, and research." She has handled this transition with ease and is masterful in her position. We would be remiss if we did not mention that, in addition to her IT work, she annually takes great pains in bringing together this newsletter. We are lucky to have her.

Of her work in the department she says, "I work with the other IT staff to establish priorities, establish policies, and work out strategic directions for the future. This means thinking about our server infrastructure, our workstation policies, our project planning, as well as doing my part to help out in day-to-day operations. I also play a role campuswide in making the voice of math known in security, onboarding, human resource IT, climate, and other governance groups. I recently completed IT Leadership training offered for a select number of IT professionals campuswide. It was quite an honor to be chosen. I like being able to approach and chat with everyone in the Math Department about IT, and I feel appreciated and challenged here."

Nagreen describes well the significance of our strong female presence: "I think there's an appreciation of the tasks that women must juggle and the struggles they have to be heard. I think there is an understanding of our climate that comes from talking to a woman colleague that you may not be able to express to a male colleague."

Women in numbers at Wisconsin continued

The IT support staff are an integral and invaluable part of the Mathematics Department at every level. As Nagreen puts it, “We offer so much to our faculty and staff that other institutions do not; we have developed resources for management of research and administration that no one else has, and we’ve worked to give flexibility to faculty and staff in their IT choices. I have heard from others in different institutions about the level of our service being superior. I’m proud of our work and our interactions with our clients.”



Julie Mitchell (Professor)

Julie Mitchell remembers being inclined to math in the 4th grade. She tended to be the best in the class. While not always getting top marks, she saw concepts more quickly than others. She underscores the value of the women here, saying, “We think of growth in female mathematicians as being linear, that as time goes on, there are a few more and a few more. However, the reality is non-linear. The more women we have, the more women want to join our ranks. Young women in our classes see role models for themselves, and they can envision becoming a mathematician themselves. Having a lot of women faculty also makes it easier to recruit new female faculty to the department.”

Mitchell pursued undergraduate studies at San José State University before completing her PhD at the University of California at Berkeley, where she studied dynamical systems and geometric analysis under the direction of Morris Hirsch. After completing her graduate work, Mitchell felt inclined to more applied and scientific work. “I looked around at many applications, from aerospace to semiconductors, not finding anything that drew me in,” she says. “Chemistry was my other favorite subject as an undergrad, and so I asked a chemist if there were interesting problems for mathematicians to work on. She pointed me toward protein structure, and I fell in love with the geometry of molecules. My postdoctoral work was at the San Diego Supercomputer Center, where I developed algorithms for studying molecular interactions based on Fast Fourier Transforms and global optimization techniques.” She is now a professor in both mathematics and biochemistry here at Wisconsin.

She describes her work as follows: “Molecular interactions underlie all physiological processes, and mathematical tools can help predict how they associate. You can think of this as being like assembling 3D puzzle pieces, where both shape and physics/chemistry of the surfaces matter. Early in my career, I used global optimization methods to find minimum energy states for two molecular structures bound together. We could often find the minimum energy, but the energy function itself was too crude, and the answers were often in the wrong place. More recently, my students and I have used the tools of data science to study molecular interactions. Instead of an energy function, we use a classification model that distinguishes correct answers from incorrect ones. You can make many types of classification models, and we particularly like to build models able to predict the effects of mutations on molecular interac-

tions. This is relevant to biomedical applications, and it can also help us understand why our biological processes are slightly different than those in genetically related organisms.”



Diane Rivard (Faculty Associate)

Diane Rivard is a faculty associate in the Mathematics Department, and has been with us since 1995. She worked part-time in the Mathematics Tutorial Program from 1995 to 2011, teaching courses, and working as the placement advisor and consultant at SOAR (Student Orientation and Registration). In 2011, she left the Tutorial Program and began full-time, teaching a course each semester, handling placement issues, and managing course enrollment and wait lists. Rivard responds to placement questions from students, parents, and advisors via email and phone and during office hours. She is the mathematics consultant for International and January SOAR, training and supervising graduate students and staff at SOAR and at the Math Registration Help Desk. The logistics of accommodating students and TAs in calculus are largely due to Rivard’s dedicated work over many years.

As an instructor, she has taught mathematics for teachers, intermediate algebra, college algebra, precalculus, quantitative reasoning, and fundamental mathematics skills. She has been awarded the Honored Instructor Award from University Housing several times. She has supervised TAs and mentors them early in their tenure, running and participating in teaching workshops. She participates in a teaching circle, a group of postdocs, junior faculty, academic staff, and graduate students interested in discussing and enhancing their teaching.

In addition to all of this, Rivard has served the department and the university community via committee work in the department, campuswide, and on University of Wisconsin System committees.

Rivard is retiring this year to Montreal, and the department is indebted to her for years of dedicated service and invaluable contribution to the department.



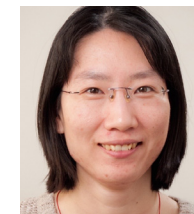
Betsy Stovall (Assistant Professor)

Betsy Stovall became a mathematician by reading novels. “At least that was how I spent all of my free time in my childhood. At the beginning of college, I planned to major in something that seemed a bit more logical for someone who spent all of her free time reading, especially since I didn’t think I was particularly good at math. I found myself procrastinating on the readings for my other courses so I could solve extra math and physics problems.” Betsy is appreciative of having so many women as professional peers and is inspired by the work of her colleagues.

Stovall went to a small high school in rural Georgia, and a scholarship carried her to Emory University for her undergraduate studies. She completed her PhD under the supervision of Michael Christ at the University of California at Berkeley, and

held a postdoctoral position at UCLA, supported in part by an NSF postdoctoral fellowship. She joined the Mathematics Department at Wisconsin as an assistant professor in 2012. She is an NSF CAREER award holder.

Stovall works in harmonic analysis, which aims to understand signals by decomposing them into simpler pieces, such as breaking a sound into its constituent notes or creating a 3-dimensional sketch of a body using 1-dimensional snapshots like a CT scan does. Stovall studies the role that “curvature” of the set of pieces plays in problems like these, studying problems connected to potential applications in engineering, physics, and medical imaging. She tells us, “Historically, the decompositions and reconstructions in harmonic analysis were all fundamentally linear, but it was discovered in the second half of the last century that curvature interacts with these processes in surprising ways.”



Lu Wang (Assistant Professor)

Lu Wang was interested in literature before reaching the sixth grade, when a devoted math teacher, also a woman, led her to the great joy of solving challenging problems in mathematics. She finds the department a very inclusive place to work, and finds encouragement and inspiration from the senior women in the department.

Wang did her undergraduate work at Peking University, and completed her PhD work at MIT under the supervision of Tobias Colding. She held postdocs at the Mathematical Sciences Research Institute, Johns Hopkins University, and Imperial College London before joining us as an Assistant Professor at Wisconsin. She is an Alfred P. Sloan fellow.

Wang’s research focuses on geometric flows, which follow the evolution of geometric objects under various geometric processes over time. Her work is particularly focused on mean curvature and Ricci flows. The mean curvature flow is a simplified model that describes crystal and grain growth and the annealing process in metals. She studies the formation of singularities in these flows, the change in the topology of the evolving surfaces through the singularities, and related topics.



Melanie Matchett Wood (Professor)

Melanie Matchett Wood became especially interested in mathematics in the seventh grade when, participating in a MathCounts program, she encountered problems that she had not been taught to solve; this was the first real problem-solving she had encountered. The women in the department help Wood feel that this is where she belongs, and she values having a large number of women role models for graduates and undergraduates.

Wood did undergraduate studies at Duke University and Cambridge University, completed her PhD under Manjul Bhargava, and was a postdoctoral scholar at Stanford University for two years before coming to Wisconsin as an assistant professor in 2011. She was an American Institute of Mathematics 5-year fellow, and is currently an Alfred P. Sloan

Research Fellow as well as a Packard Fellow for Science and Engineering. She has won the University of Wisconsin–Madison Vilas Early Career Investigator Award, an Association for Women in Math–Microsoft Research Prize in Algebra and Number Theory, and holds an NSF CAREER grant. She’s quite simply one of the most decorated of all of the faculty members in the Math Department. Her phenomenal record of research, teaching, and outreach make her a star in the department and a shining role model for all of us.

Wood works primarily in number theory and algebraic geometry, but her work also draws from probability, additive combinatorics, random groups, and algebraic topology. Moduli spaces are structures codifying the ways a particular type of object may vary. That is, they are shapes that measure families of shapes. In her PhD thesis, Wood found new explicit descriptions of certain moduli spaces for algebras and their modules. These descriptions are useful in number theory when studying number fields, and in algebraic geometry for studying certain moduli spaces there. Motivated by questions of counting certain number theoretic objects, Wood has been developing tools in probability theory to study randomly arising finite groups, which she applies deftly and broadly to a wide range of problems in number theory and algebraic geometry. Her work is deep and far reaching.



Alumni News

Haokai Xi (PhD, 2017, Advisor: Jun Yin) is a software engineer at Google.

Huanyu Wen (PhD, 2017, Advisor: Jean-Luc Thiffeault) is a quantitative research associate at J.P. Morgan.

Carolyn Abbott (PhD, 2017, Advisor: Tullia Dymarz) will join UC-Berkeley as a postdoctoral fellow in fall 2017.

Eric Ramos (PhD, 2017, Advisor: Jordan Ellenberg) won a National Science Foundation Postdoctoral Fellowship which he'll use at the University of Michigan in fall 2017.

Junda Sheng (MA, 2017, Advisor: Shi Jin) will pursue her PhD at UC-Davis starting fall 2017.

Yubin Zhang (MA, 2017, Advisor: Chanwoo Kim) is an intern at Lombarda China Fund Management Co., Ltd, in Shanghai, China.

Ahmet Kabalukak (PhD, 2017, Advisor: Andrei Caldararu) is a software development engineer at Amazon.

Vlad Matei (PhD, 2017, Advisor: Jordan Ellenberg) will join UC-Irvine as a postdoctoral fellow in fall 2017.

Meng-Che Ho (aka Turbo) (PhD, 2017, Advisor: Uri Andrews) will join Purdue University as a Golomb Visiting Assistant Professor in fall 2017.

Evangelos Dimou (PhD, 2016, Advisor: Andreas Seeger) is a lecturer at the University of Michigan.

Keith Rush (PhD, 2016, Advisor: Serguei Denissov) is the senior manager for data science in the Milwaukee Brewers organization. He is responsible for every projection of the business side of the Brewers' needs, such as ticketing estimates and revenue projections, as well as estimating, for example, customers' propensity to purchase season tickets, etc.

Gregory Datka (BS, 2016) is a client systems engineer at Epic Systems Corporation.

Aaron Peterson (PhD, 2014, Advisors: Alex Nagel, Brian Street) is an assistant professor of instruction at Northwestern University in Evanston, IL.



Keith Rush at Miller Park, home of the Milwaukee Brewers

Casian Pantea (PhD, 2010, Advisor: Georghie Craciun) won a 2016–17 Outstanding Researcher Award at West Virginia University. Pantea, an assistant professor in the Department of Mathematics, examines mathematical analysis of interaction network models. He is specifically interested in structural properties of networks related to two important phenomena: switch-like behavior and oscillations, both which underlie the cell cycle.

Rohini Kumar (PhD, 2009, Advisor: Timo Seppäläinen) has been promoted to associate professor with tenure at Wayne State University, effective fall 2017.

Ersin Ozugurlu (PhD, 1999, Advisor: Jean-Marc Vanden Broeck) became an associate professor in mathematics in 2012 at Istanbul Technical University in the Mathematical Engineering Depart-

ment (web.itu.edu.tr/ozugurlue). His last article was about brain tumor modeling, and he is now working with a group with real data on this topic. Scholar Google Citations for Ersin Ozugurlu: <http://go.wisc.edu/158j69>.

William Arvola (PhD, 1991) passed away on February 28, 2017. Bill was born April 12, 1962, in Sacramento, California, to William and Mary Arvola. Bill grew up in California and Oregon. Excelling in mathematics, he graduated from Oregon State University in three years with a bachelor's in Mathematics. Continuing his mathematical work, he earned a PhD in Mathematics from the University of Wisconsin–Madison, writing his dissertation in topology under Professor Peter Orlik in 1991. Arvola had been teaching part-time at Madison College since the fall of 2012.

Department Updates

New Employees



Daniele Cappelletti is a Van Vleck Assistant Professor. He graduated from the University of Copenhagen in 2015. His speciality is stochastic reaction networks.



Alexander Pavlov is a Van Vleck Assistant Professor. He graduated from the University of Toronto in 2015. His speciality is homological algebras and derived categories.



Noah Schweber is an NSF Research Postdoctoral Fellow. He graduated from UC-Berkeley in 2016. His specialities are Logic and Computability/Set Theory.



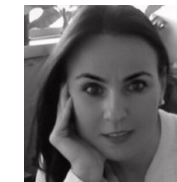
Nasar Talebizadeh Sardari is a Van Vleck Assistant Professor. He graduated from Princeton University in 2016. His speciality is number theory.



John Wiltshire-Gordon is a Van Vleck Assistant Professor. He graduated from the University of Michigan in 2016. His speciality is the representation theory of combinatorial categories.



Rachel Davis is a new Lecturer. She received her PhD from UW–Madison in 2013. Her advisory was Nigel Boston. Her speciality is number theory and algebraic topology. She'll be taking over duties from Diane Rivard after her retirement.



Elena Ungur is our new Department Administrator. Her hometown is Brasov, Romania. She studied economics at the Academy of Economic Studies in Bucharest, Romania. She received her MBA in Strategic Management at UW–Madison. Her hobbies include reading, salsa dancing, ice skating, and photography.



Kim Marston recently joined the Math Department as the HR/Payroll Coordinator, coming from UW–Extension and UW Colleges. Her hometown is Wonewoc, WI. She received her degree from UW–LaCrosse in Business Administration with an emphasis in Human Resources. She enjoys water sports no matter the season, including ice fishing and boating.

Promotions



Veneta Boyanova has been working with the Math Department for a year as the KI-Net Travel Coordinator, and now she will be the Travel Coordinator for the entire department. Congratulations, Veneta!

Retirement



Diane Rivard, Faculty Associate
Diane Rivard has been with the Math Department since 1995. She worked in the Mathematics Tutorial program from 1995 to 2011, but took on additional duties in 2011, teaching pre-calculus courses, handling placement issues, and managing SOAR, enrollment, and department waitlists. She trained graduate students to counsel students seeking course changes in the beginning of each semester and managed the Calculus Course Exam, allowing students to gain credits for passing an exam to prove their knowledge. She was named Honored Instructor by University Housing students several times. In her retirement, Diane will return to Quebec and build a new house with her husband. (Diane is also profiled as part of the Women in Math article on page 8 of this newsletter.)

Alumni News continued

2016–2017 Graduates

Carolyn Abbott (Advisor: Dymarz)

Meng-Che Ho (Advisor: Andrews)

Ahmet Kabakulak (Advisor: Caldararu)

Vlad Matei (Advisor: Ellenberg)

Yu Li (Advisor: Bing Wang)

Jeff Poskin (Advisor: Alberto Del Pia)

Eric Ramos (Advisor: Ellenberg)

Daniel Ross (Advisor: Ellenberg)

Keith Rush (Advisor: Denissov)

Paul Tveite (Advisor: J. Miller)

Keija Wang (Advisor: Boston)

Kun-Chieh Wang (Advisor: Roch)

Huanyu Wen (Advisor: Thiffeault)

Haokai Xi (Advisor: J. Yin)

If you have alumni news, we'd love to hear about it! <http://go.wisc.edu/9do819>
Visit this link for a survey that collects alumni updates at all times of the year.

Our Alumni Historical Ph.D. Database now includes recent thesis titles and is searchable by year. Check it out! <http://go.wisc.edu/zx59c6>

Undergraduate Student Awards

Violet Higgitt Frank Scholarship

Thomas Hameister

Dowling Scholarship

Zhangpeng Zeng

Irman Newman Scholarship

Tom Stone

Mary Ellen Rudin Scholarship

Anne Ulrich

David L. Young Scholarship

Kirill Gura

2017 Undergraduate Math Competition

First Prize Shouwei Hui, Hasan Eid

2nd Prize Xiaxin Li

3rd Prize Daotong Ge, Thomas Hameister

2016 Putnam Exam

The exam was taken by 4,164 contestants from 568 institutions last December. Nationwide, the median score was 1 out of 120, the top score was 114.

Twelve UW students took the exam. Our Putnam team placed 28th (which is pretty close to the best we've done recently: we were 27th in 2013). Congratulations to the three team members: **Daotong Ge**, **Thomas Hameister**, and **Benjamin Bandli**. For the second year in a row, our top scorer was **Daotong Ge**; this year he got into the top 100 nationwide with 56 points! (Which was also within one point of earning an Honorable Mention.)

Undergraduate Honors

Several students have been honored with campus-wide scholarship awards.

Applied Mathematics, Engineering and Physics Students

Idris Boukahil: David H. Durra Scholarship

Kevin Langhoff: Mary Schreiber LeBlanc & Duwayne LeBlanc Scholarship

Jack Nuckles: Margaret E. and Allard Smith Undergraduate Scholarship

Mathematics Students

Xinyu He: Margaret A. Goldman Scholarship

Catherine McSorley: Gerald W. and Tui G. Hedstrom Scholarship

Konstantinos Papakostas: College of Letters & Science General Scholarship

Mathematics Students inducted in the National Honors Society, Phi Beta Kappa

Rebekah Dix

Rachel Gruenke

Zachary Legge

Tom Stone

Rose Walters

Fanghao Zhong

Amir Alwan

Lizzie Brown

Erwin Chen

Thomas Hameister

Michael Hermsen

Evan Hernandez

Noah Johnson

Daniel Kaczmarek

Jacob Kettinger

Calvin Kosmatka

Gage Meyer

Mackenzie Meyer

Dylan Pozorski

Talent Search

Each year, the Math Department manages the Wisconsin Mathematics, Engineering and Science Talent Search (<https://www.math.wisc.edu/talent>). Students throughout Wisconsin (and the country) try their hand at five problem sets, submitting them and hoping for top scores. These problem sets are difficult, but not so advanced that preteen and teen math students can't figure them out. And each year, the Math Department gives out the Van Vleck Scholarship to a student (or students) who do the best on the problem set questions and a final qualifier exam held each spring. The Van Vleck Scholarship is \$6,000 per year over a four-year scholarship at the University of Wisconsin.

This year, in the 52nd year of the Wisconsin Mathematics, Engineering and Science Talent Search, we had two amazing winners. Chatchanun Suriyaammaranon of Oregon West High School, Oregon, WI, and Mostafa Hassan of eAchieve Academy. The awards were announced at the Annual Talent



Organizer Jonathan Kane, Organizer Melanie Matchett Wood, Winner Chatchanun Suriyaammaranon of Oregon, WI, Provost Sarah Manglesdorf, Organizer Benedek Valko. Not pictured: Winner: Mostafa Hassan of Milwaukee, W

Search Honors Day where the top-scoring students are celebrated.

We are thrilled that so many math-hungry students participate in our program and make our Talent Search competition such an amazing experience for all involved. ■

Graduate Student Awards 2017

The department recognized several students for especially significant contributions in research and for outstanding performance as teaching assistants.

Excellence in Research Awards

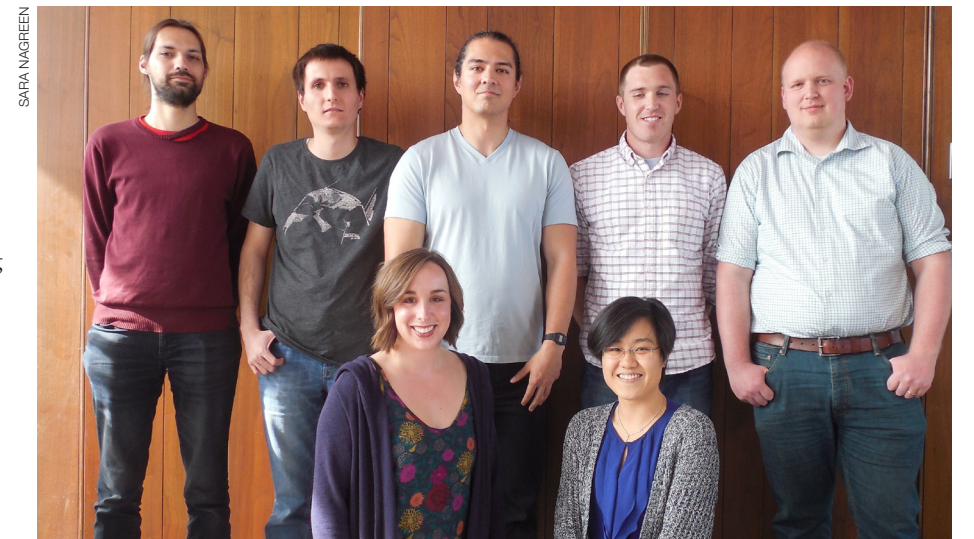
Yu Li is a student of Bing Wang working in geometry. In his thesis he generalized a technique of Perelman and Hamilton on the Ricci flow on three dimensional manifolds to non-compact asymptotically Euclidean manifolds and provided a Ricci flow proof of the Schoen-Yau positive mass theorem in three dimensions. In high dimensions he proved a strong convergence result whenever the Ricci flow exists globally.

Tau Shean Lim, advised by Andrej Zlatoš, works in the area of reaction-diffusion equations which model reactive processes such as combustion, chemical reactions, or population dynamics. Among other achievements, Lim extended classical results of Aronson-Weinberger on propagation of reactions in multidimensional homogeneous media to models with non-local diffusion, and found a characterization of those non-local diffusion operators which give rise to traveling fronts for ignition-type reactions.

Eric Ramos is a student of Jordan Ellenberg specializing in asymptotic aspects of commutative algebra and representation theory of categories. He has written five papers in the area. His most notable achievement on homological invariants of FI-modules substantially generalizes, clarifies, and illuminates recent results of Ellenberg and Church on Castelnuovo-Mumford regularity.

John Nobel Prize in Applied Mathematics

John Nobel was a professor in the Department of Mathematics at the University of Wisconsin-Madison from 1961 to 1991. He was professor emeritus until his death in 1999. At Wisconsin, Professor Nobel was Chair of the Department from 1968 to 1970, and Director of the Mathematics Research Center (MRC) from 1979



The following students received departmental awards for outstanding performance as Teaching Assistants, Front left: Micky Soule Steinberg, Polly Yu; Top left: Vladimir Sotirov, Vefa Goksel, Hans Chaumont, James Brunner, Paul Tveite. Not pictured: Keith D'Souza, John Lynch, Solly Parenti

to 1987. He was the founding director of the new Center for Mathematical Sciences (CMS) from 1987 to 1990. His research interest initially focused on Volterra integro-differential equations. In later years, his interests changed to mathematical problems in viscoelasticity and non-Newtonian fluid dynamics. The John Nobel Prize in Applied Mathematics was established to honor his memory and his good work with young people. The prize recognizes a graduate student who writes an outstanding PhD thesis in applied mathematics at UW-Madison.

Liu Liu is advised by Shi Jin and works on the development of efficient numerical methods for kinetic equations and quantum dynamics with random inputs. She initiated an analytic study for the semiconductor Boltzmann equation with random input in which she established the regularity of the solution in the random space, and then proved the spectral convergence of the stochastic Galerkin method for the underlying equation.

William Mitchell was advised by Saverio Spagnolie. He studies structure interaction problems in highly viscous flows, and develops fast and accurate computational methods for solving them. After deriving a new traction boundary integral equation for Stokes flow, Mitchell was able to investigate the shapes

and dynamics of bodies with arbitrary geometry, in background flows, and near surfaces. He applied his methods to applications in gravitational sedimentation and erosion by viscous stresses.

Elizabeth Hirschfelder Scholarship

Elizabeth (Stafford) Hirschfelder (1902-2002) received a PhD in mathematics at UW-Madison in 1930 and taught for almost twenty years in the Math Department. In the 1990s she established a scholarship fund for graduate women in mathematics, chemistry, and physics.

In 2017 Hirschfelder scholarships were awarded to **Yuan Liu**, **Hanqing Lu**, and **Yuhua Zhu**.

Yuan, a fourth year PhD student advised by Nigel Boston, works in algebraic number theory and proved various results on an extension of the inverse Galois problem. Hanqing and Yuhua are first-year PhD students advised by Shi Jin who have both completed early papers in their research on problems in numerical analysis.

L&S Teaching Fellow

Di Fang and **Alisha Zachariah** were named 2017 College of Letters & Science Teaching Fellows.

Faculty/Staff News

Dima Arinkin has been named as Vilas Associate. The Vilas Associate program is an internal competition that recognizes new and ongoing research of the highest quality and significance.

Professor Emeritus **Joshua Chover** had a show of his art, titled “From my Inner Eye,” at the Pyle Center on the UW campus during December 2016. Read more: <http://go.wisc.edu/6n1569>

Jordan Ellenberg has won a Kellett Mid-Career Award. The Kellett awards recognize outstanding faculty seven to twenty years past their first promotion to a tenured position. Jordan is one of eleven faculty on campus to win this honor this year. Read more: <http://go.wisc.edu/91429a>

If you think you’ve seen someone familiar in the movie trailer for “Gifted,” you aren’t imagining it. Professor **Jordan Ellenberg** is seen at 1:31. Take a look yourself....<http://go.wisc.edu/7hu86b>

Daniel Erman did a guest video with the YouTube series Numberphile about the Josephus problem. This was one of the first problems he encountered in high school where he didn’t know how to approach a complex problem with a wide variability of inputs and solutions. He talks about an early mentor who encouraged him to spend time experimenting with the inputs and solutions to see if he could find a pattern. He explains the process to web viewers in a simple and accessible way, much like his early mentor did. Check out the video here: <https://youtu.be/uCsD3ZGzMgE>

Daniel Erman is also the faculty advisor for the UW Math Circle (<http://go.wisc.edu/bui1yz>), which is an outreach group dedicated to helping younger students interested in math learn more about the many exciting things you can discover by experimenting with numbers.

Shamgar Gurevich and his collaborators (Roger Howe, of Yale and Texas A&M, John Cannon, of the Univer-

sity of Sydney, and Steven Goldstein, UW–Madison) recently revealed a breakthrough in the notion of “size” in symmetries of spaces, and a new discovery of “eta correspondence” to describe explicitly “small” symmetries.

Steffen Lempp has been on a one-year sabbatical in Singapore and having loads of fun with the half-dozen logicians at the two universities there. He also visits the National Institute of Education regularly to try to find out what Singapore math is really all about.

Professor Emeritus **Paul Rabinowitz** was elected as a foreign member of the Russian Academy of Sciences as part of its 2016 class. He shares this honor with three other mathematicians as well as Henry Kissinger.

Steven Sam has been awarded a Sloan Fellowship. Steven was one of 126 early-career scholars that represent the most promising scientific researchers working today. Their achievements and potential place them among the next generation of scientific leaders in the U.S. and Canada.

Timo Seppäläinen co-organized the 2017 American Mathematical Society Short Course on Random Growth Models which was held January 2–3, 2017, just before the Joint Mathematics Meeting in Atlanta. The title of the course was Random Growth Models, and it was organized by Michael Damron (Georgia Tech), Firas Rassoul-Agha (Utah) and Timo Seppäläinen(UW–Madison). The course consisted of lectures by six experts and was aimed at a broad audience, from the casually interested to researchers in probability. The October issue of the *AMS Notices* presented a preview of the course (<http://go.wisc.edu/4pq4h0>) and a light introductory article (<http://go.wisc.edu/h9p59y>).

Congratulations to our own **Brian Street**, the winner of the Certain/Sandefur award. The Certain/Sandefur award is given to one newly tenured Professor in the College of L&S in recognition of both research and teach-

ing excellence. Brian stood out among 27 newly promoted and astonishingly impressive Associate Professors.

Benedek Valko has been named a Simons Fellow. The Simons Fellows in Mathematics programs provide funds to faculty for up to a semester-long research leave from classroom teaching and administrative obligations. Such leaves can increase creativity and provide intellectual stimulation. The goal of the Simons Fellows program is to make it easier to take such leaves, or to extend sabbatical leaves by an extra half-yea Valko will be on sabbatical 2017–18. It is a very competitive program; being named a Fellow is a significant recognition.

Jean-Luc Thiffeault was recently featured in the *Washington Post’s* Wonkblog on his paper exploring the mathematical history of taffy pullers. (Read more: <http://go.wisc.edu/vg3hb2>)

In the article, Thiffeault describes moving from exploring taffy as part of fluid dynamics lectures to exploring where taffy machines came from and how they’ve evolved to be mathematical models of efficiency in mixing, if only to introduce enough complexity to avoid another’s patent. Thiffeault even thought about how to make his own more efficient model, as evidenced by his prototype for his improved taffy puller. (Link: https://youtu.be/pd_KMGs2nZQ). Rest assured, Thiffeault isn’t going to ditch his job to make a living pulling taffy, noting “Making candy is really difficult...The process was a revelation into how complicated it is.” <http://go.wisc.edu/9hbs90>

The Faculty Early Career Development (CAREER) Program offers the National Science Foundation’s most prestigious awards in support of the early career-development activities of those teacher-scholars who most effectively integrate research and education within the context of the mission of their organization. The Math Department has three winners of CAREER awards this year: **Melanie Matchett Wood**, **Betsy Stovall**, and **Steven Sam**.

2016–2017 Donors List

The Math Department would like to thank its donors for their generosity during this year. Your support helps us fund our outreach and education objectives, and keeps the UW–Madison Math Department among the top math departments in the world.

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Ms Judy A O’Connor
Professor Eleanor Strauss
Dr Matthew J Harrington
Mr Erik E Stevens



Professor Julie Mitchell assists children in playing a video game called FoldIT during Saturday Science. The goal is to fold proteins (e.g., enzymes, antibodies) by making moves that create hydrogen bonds and other favorable non-covalent interactions, and by avoiding unfavorable collisions between atoms.

Secrets of Mathematics at Saturday Science

On the first Saturday of each month over 700 kids and parents from around Wisconsin descend upon the Wisconsin Institute for Discovery (WID) for Saturday Science. When it was announced that the theme for last August's event was "Secrets of Mathematics" we jumped at the opportunity to share our excitement and appreciation of math with others. In the end, over a dozen members of the department hosted seven booths!

The Math Circle ran tables focused on the mathematics behind games like Set, Nim, and Chomp. Kids and parents alike explored questions such as, "What is the largest number of Set cards one can have without a set?" Participants also tried their hands at defeating the "game master" with Babcock Hall ice cream on the line.

The department also organized six other booths on a broad range of topics. For example, one table had students explore elementary graph theory and topology via the Bridges of Konigsburg problem, and another focused on the

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infamous Monty Hall problem (a clever question in probability that is reputed to have even tricked Paul Erdos). The event was a huge success, with 661 participants coming in to have fun with math. We look forward to participating in Saturday Science again in the future.

A special thanks to the graduate students who staffed booths: Jay Yang, Ivan Ongay Valverde, Micky Steinberg, Soumya Sankar, Adrian Tovar Lopez, Ryan Julian, Daniel Hast, Eva Elduque, Jim Brunner, and DJ Bruce. ■

Article by Phillip Wood, DJ Bruce