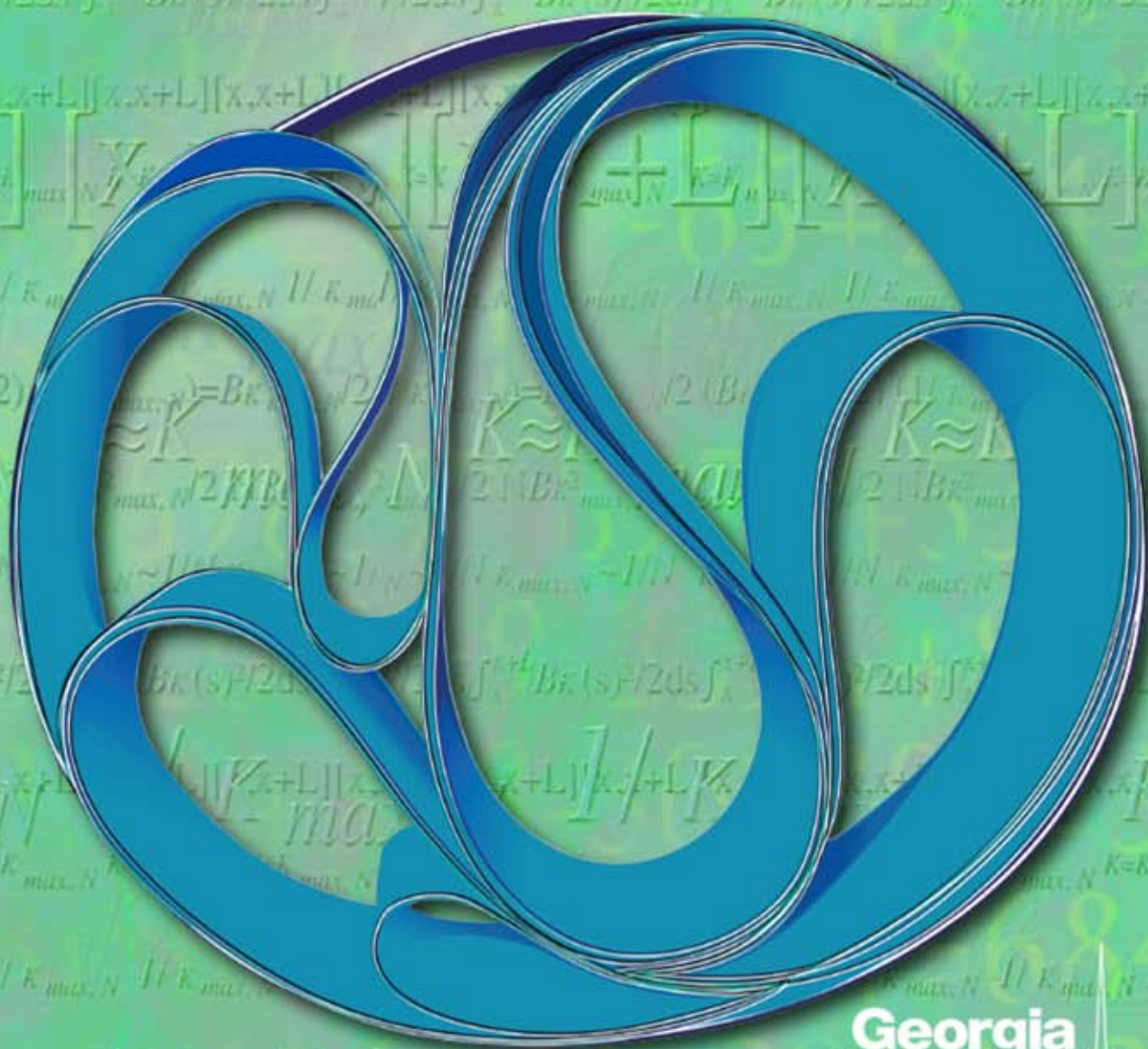For ALUMNI and FRIENDS

Proof Reader

From the School of Mathematics, College of Sciences @ Georgia Tech

Georgia Tech

The State of the School of Mathematics

As of April, 2009…

For the past seven years, I have held one of the best jobs on the planet: Chair of the School of Mathematics… but life has seasons and changes are always just around the corner. In just a couple of months, my term will end, and Dr. Doug Ulmer will become the new Chair of the School of Mathematics. Doug is currently Professor of Mathematics and Associate Head for the Graduate Program at the University of Arizona.

I hope I have served the students, faculty, staff and administrative officers well and that I leave office with the School well positioned for the future. Nevertheless, I recognize that Doug will bring new energy and determination to the job, strengths that will help the School continue to advance in future years. Please join me in welcoming Doug and his family to the School of Mathematics community.

This is my fortieth year of professional service, including five terms as Chair of a mathematics unit. In each of these assignments, I have been fortunate to have worked with talented, dedicated faculty and staff, but none comes close to matching my experiences here at Georgia Tech. To all who have worked with me here in the School of Mathematics and across the campus these past seven years, I would like to express my deep appreciation.

After a short break, I'll be back as a regular faculty member, teaching more courses, spending more time with my PhD students and getting my research productivity back up to where it used to be. It will be fun to watch the School grow stronger and gain in recognition. That's the natural way at Georgia Tech!

—Tom Trotter, Chair, July 2002–June 2009

Photo Courtesy of Dr. Fred Andrew. Visit picasaweb.google.com/fred.andrew/CULCFromBungerHenry# for more construction photographs. Also available at 128.61.156.78/view/index.shtml is the live view of the Clough Undergraduate Learning Center (CULC) construction site.

Looking Ahead...

We live in exciting, perhaps even unsettling times. However, there is one source of excitement that anchors us all: the state of Mathematics at Georgia Tech. The School of Mathematics faculty members are making great strides in research and are bringing in grants and awards at a record pace. Our graduate students are writing strong dissertations and getting excellent first positions. Our undergraduates continue to be among the best students on campus and are moving on to top graduate programs or important jobs in industry. And, our staff is recognized as a model to be emulated across campus. The School is carrying out all of its missions with great energy, enthusiasm and quality.

Mathematics plays a central role in any university, and all the more so at an Institute of Technology. When I was interviewing for the position of Chair of the School of Mathematics, one of the most outstanding aspects of Tech to me was the fact that the centrality of mathematics was clearly recognized by the Institute's upper administration. It was evident that the College of Sciences' Dean Houston and Provost Schuster were actively interested in the trajectory of mathematics at Tech and were ready and willing to support the School as it strives to reach even higher levels of success.

One concrete step forward we'll see in the near future is additional space allocations for the School in the Skiles classroom building as well as some improvements to our existing space. In another direction, we'll soon be forming an advisory board for the School that will help us develop new resources and provide the best opportunities for our students. Stay tuned for more on these and other important developments.

The successes of the School in recent years have come about because of the talent, drive and dedication of the faculty, staff and students. Special thanks are also due to Tom Trotter who has done an absolutely stellar job leading the School of Mathematics for the last seven years. He leaves it in an excellent position. I am very pleased and excited to be the incoming Chair and I look forward to working with all of you as we continue to strengthen Mathematics at Georgia Tech.

—Doug Ulmer, Chair, July 2009

SOM Statistics Spring 2009	
Faculty	52
Emeritus Faculty	13
Academic Professionals	3
Instructors	2
Visitors and Postdocs	15
Staff	12
Graduate Students	109
Undergraduate Students	150

Remembering Life at Skiles…

The Old Shop

Skiles 1960

Bill Smythe

Jim Herod

David Ho

Our move from the Old Shop to Skiles took place during the fall quarter of 1959 when Marvin Sledd was School Director and Bert Drucker was Associate Director. Under their leadership the move went smoothly, as did the admission and integration of more and more women over the next few years.

Before the move, Bert invited Bob Kasriel and me to walk over to Skiles with him one day to explore our future quarters. We roamed the halls, looked into some classrooms and offices and then tried a little experiment. One of us went into a classroom and talked as if teaching a class while the others listened in an adjacent room. Since the listeners could not hear the speaker, we decided that Skiles was indeed an improvement over the thin-walled Old Shop.

Most of us looked forward to working in a modern building with more comfortable and efficient offices and classrooms and we were especially pleased to have individual private offices. We did appreciate our improved facilities, but, of course, we also came to realize that the "New Classroom Building" (as it was known back then) was not perfect. Each office had a telephone (black, rotary dial) but most of us had to share a line with a colleague in another office. The air conditioning system seemed to malfunction almost from the start, with some rooms getting too hot and others too cold.

And then there were the pigeons: what a mess they made on the office window ledges! They seemed to find ideal nesting sites in the spaces between the glass and the metal louvers. David Ho tells of finding a nest containing two eggs next to his window while a third egg was on the ledge outside the nest. Perhaps the parents knew they couldn't provide for more than two kids, so apparently Skiles pigeons could count, at least to three.

To save electricity, motion detectors were installed in classrooms to automatically turn off the lights when the room was not in use. Jim Herod reports that he had to turn the sensor to face him as he paced in front of the class, for otherwise the lights would go out when his students went to sleep.
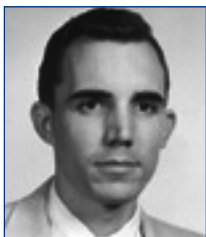
There was a period (in the '70s I believe) during which there was a spate of bomb threats. After a threat was phoned in, Skiles would be evacuated and campus police would search the building for a bomb. None was ever found, but on one occasion an officer jokingly reported that in one of the offices it appeared that a bomb had already exploded. Perhaps the officer misguidedly thought that a neatly organized mathematical mind necessarily implied an orderly office.

—Dr. Bill Smythe, with contributions from Dr. Jim Herod and Dr. David Ho

Skiles

Editorial note: Thanks to Dr. George Cain (L), Dr. David Haley (R) (MS Applied Mathematics 1965) and John Holcolmbe in the Capital Planning and Space Management Office for providing the following details. Ground for Skiles was broken on January 23, 1958, and the building was accepted on November 17, 1959. Classes started there in the Winter of 1960 and housed these units: School of Mathematics, School of Industrial Management, Department of English, Department of Modern Languages, and Department of Psychology.

Who are these faculty members?

Local area alumni who contact the ProofReader editor (editor@math.gatech.edu) with the year of the photo and the most correct names will win a coffee break with our new School Chair, Doug Ulmer!

Thank a Teacher, March 2008–April 2009

"Thank a Teacher" is an ongoing program designed by the Center for the Enhancement of Teaching and Learning (CETL) to give Georgia Tech students an easy way to show their appreciation to members of the faculty or teaching assistants (TAs) who have made a difference in their education. The students send a thank-you note to someone who has helped them learn and, in so doing, they let Georgia Tech faculty and TAs know that students value good teaching.

Listed below are the School of Mathematics faculty members and teaching assistants who were recipients of thank you notes between March 2008 and April 2009.

Faculty:
Fred Andrew
Igor Belegradek
Jean Bellissard
Rena Brakebill
Shui-Nee Chow
Luca Dieci
John Etnyre
Guillermo Goldsztein
Klara Grodzinsky
Sung Ha Kang
Doron Lubinsky
Tom Morley
Enid Steinbart
Tom Trotter

Postdocs:
Shengfu Deng
Valerie Hower

Graduate TAs:
Jake Boggan
Michael Burkhart
Alan Diaz
Allen Hoffmeyer
David Howard
Huy Huynh
Ian Palmer
Ramazan Tinaztepe
Ben Webb

Undergraduate TAs:
Aisha Arroyo
Daniel Connelly
Keith Jones

A Conversation with Dr. Wing Suet Li...

- BS in Mathematical Sciences 1986 from University of Iowa
- PhD in Mathematics 1990 from University of Michigan
    Advisor Dr. Bert Taylor
    Dissertation "On Polynomially Bounded Operators"
- Postdoc completed 1992 with Dr. Hari Bercovici
- Current interests: operator theory, functional analysis and control theory

Dr. Wing Li is a very busy person. Since joining the School of Mathematics (SOM) in 1992, she has taught many classes including honors calculus, abstract vector spaces, linear algebra, and undergraduate and graduate real analysis. Professor Li has also received numerous National Science Foundation (NSF) research grants and took a leave of absence to serve as an NSF program director in 2004-2006.

When Dr. Li came back from the NSF, Dr. Gary Schuster appointed her to the Georgia Tech ADVANCE Team as the College of Sciences representative. The goal of the ADVANCE Program is to increase the participation of women in the scientific and engineering workforce through the increased representation and advancement of women in academic science and engineering careers. (Visit www.advance.gatech.edu for more information.) Dr. Li served as the program chair during the Spring semester, 2009.

Wing and daughter Alice

Wing's colleagues are very proud of her achievements. Professor Fred Andrew recalls, "When we interviewed Wing, I was impressed by her mathematics but I also had the strong feeling that she would become a really good departmental citizen. And she has." Professor Shui-Nee Chow said, "When I first met Wing, I knew that we found a 'star' young mathematician and I was right!"

We caught up with her recently and had the following conversation.

Q: What research topics are you working on currently?

A: I have been working on a problem of finding the eigenvalues of the sum of two Hermitian matrices with Hari Bercovici for 10 years. This topic covers many areas of mathematics—algebraic geometry, representational theory,

continued Dr. Wing Suet Li...

Some members of the GT ADVANCE Team: from left, Mary Frank Fox, Mary Jean Harrold, Christina Shalley, Wing Suet Li and Mary Ann Ingram.

matrix theory, and analysis. Hari and I are exploring the topics from the analyst's point of view.

Q: What is your teaching philosophy?

A: The study of mathematics is a linear chain of events, i.e. to understand a new topic, you need to have a good understanding of the previous topic. This dependency is far more obvious than in other disciplines. My objective is to prepare students to be ready for the next level of study (topic or course). At the end of a course, a student should have better analytical skills and have gained a higher level of mathematical maturity than they had when entering.

Graduate students are required to take the graduate real analysis course to prepare for a comprehensive exam. Therefore, when teaching this course, I have the responsibility to make sure that the breadth and depth of the course will adequately prepare them for the exam. This takes precedence over looking at any particularly interesting areas from my perspective.

Q: What is your role in the ADVANCE Program?

A: My role as Chair is to recruit and retain women professors and graduate students at Georgia Tech. Based on my experience at the NSF, I believe strongly that a diverse pool of faculty provides a healthy work environment.

In fact, my experience at the NSF brought up issues that I would not have normally thought about as a faculty member, e.g. the number of women mathematicians. Approximately 30% of graduate students in mathematics are women and this percentage decreases at the rank of professor.

When I was in the Division of Mathematical Sciences at the NSF, eight of the approximately twenty-five program officers were women. I had never worked with so many women together. It was just great. You see, the guys like to talk about sports, and I was never a big sports fan; I could never participate in the conversation, so I decided that I just did not care to be part of the 'cult'. At the NSF, I discovered the pleasure of conversation with other women. As our personal bonds got stronger, it became easier to work together, not only with female colleagues, but also with everyone. It was just a very different environment and atmosphere.

As an NSF program director, I co-led and organized almost a dozen panels to determine proposal funding, I discovered that the more diverse panels (gender, school size and type) had different dynamics than the more homogeneous panels. I concluded that to maximize the outcome, we need a more diverse pool of opinion.

Q: What advice do you have for graduate students in mathematics who plan to go into academia?

A: If you are talented in mathematics, there are many rewarding careers available to you. However, if you wish to go into academia, it is not enough just to be talented

in mathematics; you must be passionate about it! You need the passion and stamina to deal with the struggle and frustration when you are stuck on a theorem.

Q: What advice do you have for junior professors?

A: You should have a support network of colleagues to help you in the areas of teaching, research and funding. I think during those earlier days at the SOM, Shui-Nee Chow, in his capacity as Chair, helped me a lot to build my support network. He helped me invite visitors to the SOM. He encouraged me to travel, and helped me arrange my teaching so that I could attend conferences in Europe easily and could collaborate with colleagues outside of Atlanta or outside of the US.

During a school retreat right after I had joined Georgia Tech, I suggested playing a game of tennis with Shui-Nee. He was a much better tennis player than I—just about everyone who liked to play tennis was better than I—but he would play with me and from there I got a tennis game going on Wednesday afternoons for some time. Eventually, there were over ten people on the tennis mailing list who became part of my support network. It is important to have such a network. I was very fortunate to have had Shui-Nee as my chair.

Q: In addition to your academic career, you and your husband, Philippe Barbe, have a very busy family life with two young children. Tell us about balancing your personal and professional life.

A: First of all, I think that you should ask this question to everyone being interviewed. We all have to 'balance' them somehow. In my opinion, this is rather hopeless. I love my children and my family; I love mathematics and my work. I never have enough time for everything that I want to do, so I do what I can. Rather than feeling guilty about not spending enough time with family or work, I choose to think that I am fortunate to have more things that I want to do than I am able to do. It is a good feeling to be passionate about one's work and one's family. By the way, my personal life now largely consists of my family life. My violin and tennis have to wait. In the act of balancing, I have little time for myself. There is no magic formula here.

Buzz with Marc-Alexandre and Alice Barbe

Faculty and Postdoctoral Awards...

Doron Lubinsky

Liang Peng

Christian Houdre

Vladimir Koltchinskii

• **Dr. Doron Lubinsky** was one of the two recipients of the 2008 Geoffrey Eichholz Teaching Award, given annually to faculty members who excel in their teaching of foundation courses taken by freshmen and sophomores at Georgia Tech. The Award consists of a $5,000 prize. Dr. Lubinsky joins former Eichholz award winners Dr. Michael Loss and Dr. Evans Harrell.

• **Dr. Liang Peng** was elected in April 2009 as a Fellow of the Institute of Mathematical Statistics (IMS) honoring his outstanding research and professional contributions. It is these contributions that help the IMS maintain its leading role in the field of statistics and probability.

Each newly elected Fellow will be welcomed and presented with a plaque at the IMS Annual Meeting during the Joint Statistical Meetings to be held this coming August in Washington, DC. Dr. Peng joins Dr. Christian Houdre and Dr. Vladimir Koltchinskii, both of whom were elected to IMS Fellowship in 2004.

• **Dr. Prasad Tetali**, Professor of Mathematics and Computing, and a member of the Algorithms, Combinatorics and Optimization (ACO) multidisciplinary PhD program, was appointed Editor-in-Chief of the SIAM Journal on Discrete Mathematics (SIDMA) in October 2008. While maintaining very high standards, SIDMA is perhaps the broadest among discrete mathematics journals. Dr. Tetali's appointment

Pedal power commuter Prasad Tetali

was announced following the reports of two SIAM committees charged with charting the future direction of the Journal. The committees recommended that "in choosing the next Editor-In-Chief for SIDMA, SIAM should search for a researcher whose own work displays the breadth sought for the journal."

Dr. Prasad Tetali was also one of four Georgia Tech professors named as a Fellow of the Society for Industrial and Applied Mathematics (SIAM) in May 2009. Dr. Tetali was recognized for contributions to discrete mathematics and algorithms. The other Georgia Tech professors named as Fellows were Dr. William Cook, Dr. Ellis Johnson, and Dr. George Nemhauser. All three Fellows are Industrial and Systems Engineering professors and members of the ACO program.

• **Dr. Robin Thomas** was a member of the four-person research team that was awarded the 2009 Fulkerson Prize. The other team members were Dr. Maria Chudnovsky (Columbia University), Dr. Neal Robertson (Ohio State University), and Dr. Paul Seymour (Princeton University). Dr. Thomas serves as Director of the ACO program.

The Fulkerson Prize is sponsored jointly by the American Mathematical Society and the Mathematical Programming Society. This year's prize, which includes a $1,500 cash award, will be presented at the opening session of the 20th International Symposium on Mathematical Programming in Chicago, on August 23, 2009. Dr. Thomas, along with Dr. Robertson and Dr. Seymour, also shared the 1994 Fulkerson Prize. It is very rare to have repeat awards in such a competition.

• The School of Mathematics received a $2,000 donation in recognition of Dr. Tom Trotter from the College of Sciences (COS) Ralph and Jewel Gretzinger "Moving Forward School" Award. The purpose of this award is to recognize the leadership of a School chair or former chair who has played a pivotal role in one or more of these areas: diversifying the tenure or tenure-track faculty composition in view of gender or race, creating a family friendly work environment and providing a supportive environment for junior faculty.

• Two talented young mathematical scientists received NSF postdoctoral fellowships in 2009, with their sponsoring senior scientists being members of the School of Mathematics faculty. Dr. Kevin Costello worked with Dr. Prasad Tetali, and Dr. Valerie Hower worked with Dr. Christine Heitsch. To the best of our knowledge, Dr. Eric Carlen is the only other member of the School of Mathematics faculty who has served as a sponsoring senior scientist for an NSF postdoc fellow.

Robin Thomas

Tom Trotter

Promotions

To Full Professor:

Mohammad Ghomi

Liang Peng

Chongchun Zeng

To Associate Professor with Tenure:


Plamen Iliev

Heinrich Matzinger

New Faculty

Sung Ha Kang
Assistant Professor

Professor Kang comes to Georgia Tech from the University of Kentucky, where she was an Assistant Professor of Mathematics. She received her PhD in Applied Mathematics from University of California, Los Angeles, in 2002 and her B.S. in Mathematics from Yonsei University (Korea) in 1997. Professor Kang is a computational mathematician, and works in numerical analysis. Specifically her research is in image processing, including denoising, deblurring, computer vision, and total variation methods for inpainting into regions in which the image is blurred, damaged or missing. Her appointment enhances the School's participation in the Computational Science and Engineering graduate program and lead to further interdisciplinary collaboration.
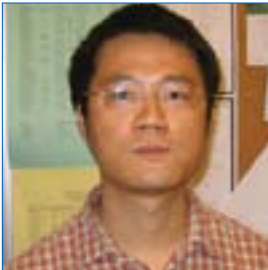
Zhiwu Lin
Assistant Professor

Professor Lin received his PhD in 2003 from Brown University. He served as a Postdoctoral Researcher at the Courant Institute for three years and comes to Georgia Tech from the University of Missouri, where he was an Assistant Professor of Mathematics. His research is in fluid dynamics, kinetic theory, nonlinear waves, and stability theory, and overlaps with interests of other faculty members, both in Mathematics and in other units of the College and Institute.

Richard Millman
Director, Center for Education Integrating Science, Mathematics and Computing (CEISMC)

Professor Millman holds a joint position as Professor of the Practice in Mathematics while serving as Director of CEISMC. He comes to Georgia Tech from the University of Kentucky where he served as the Outreach Professor of Mathematics. He began his academic career as a mathematician, conducting research in differential geometry. He was an Assistant Professor at Ithaca College, then rose through the ranks to Professor at Southern Illinois University. He served as Department Head at Michigan Technological University followed by an appointment as Dean of the College of Science and Mathematics at Wright State University. He held Provost positions at California State University, San Marcos, and Whittier College, and was President of Knox College. He also served two appointments as Program Director at the National Science Foundation.

Asaf Shapira
Assistant Professor

Professor Shapira holds a joint appointment between the Schools of Mathematics and Computer Science. He received his PhD in 2006 from Tel Aviv University and worked as a Postdoctoral Researcher in the Theory Group of Microsoft Research. He works on discrete mathematics (including extreme combinatorics) and its interface with theoretical computer science. He is expected to contribute substantively to both Schools.

Dr. Clemmie Whatley:
Role Model and Mathematics Educator Extraordinaire

- BS in Mathematics from Clark Atlanta University
- MS in Applied Mathematics from Georgia Tech
- PhD in Educational Studies from Emory University
- University of West Georgia—Educational Specialist Degree in Secondary Mathematics and Educational Leadership
- Mercer University—Teaching Certification

Dr. Clemmie Whatley came from a small unincorporated community known as Chubbtown (named after her mother's paternal side of the family) located three and a half miles southeast of Cave Spring, Georgia. She and Grace Nibaldi were the first two African-American women to graduate with a Master of Science Degree in Applied Mathematics from Georgia Tech in 1973. While at Georgia Tech, she served as a teaching assistant and received high evaluations for her teaching abilities.

After graduation, she was employed by BellSouth, formally Southern Bell, as a junior engineer, then rose quickly through the ranks of engineer and project manager before moving into quality assurance and human resources. Over a career spanning twenty-two years, she held many positions and counts among her accomplishments the implementation of BellSouth's Total Quality Management and the improvement of the organizational design of Human Resources functions.

While working at BellSouth, Dr. Whatley also began tutoring children who were struggling in mathematics and science. When you talk with her, you can immediately sense her passion for mathematics so it should come as no surprise that she has been able to develop a program to help students who are failing mathematics overcome their dislike of the subject matter,

A pianist herself, Dr. Whatley observed that children who studied music also performed better academically. In 2005 she connected her two passions and the concept of teaching mathematics through the universal language of music was born. Not only did she see students' mathematics skills improve every day, but she also found that they were now actually enjoying mathematics more than they ever had. She decided to return to school to pursue her teaching certification in secondary mathematics. As soon as she received her teaching certificate, she began teaching full time.

Dr. Whatley founded a nonprofit organization called Educational Dynamix to facilitate the distribution of her Musical Mathematics program. The unique program teaches children mathematics skills using musical styles that they can relate to: from Hip Hop to Latin. The program is now being shared with high school students in Cobb County who in turn are teaching it to students at a neighboring elementary school. Also, Musical Mathematics is being used by the YMCA at Carver Villages in the after school program for students in Grades K–5.

Dr. Whatley's advice for traditional as well as non-traditional college students is to always stay focused, define your overall goal and stick to it. She notes that if students always keep what they value in mind and do not stray from those values they will be able to achieve whatever they want in life.

—Sharon McDowell
Academic Assistant (See Sharon's profile in this issue.)

From Proofs and Punchcards to Clouds and Heavens:
The Distinguished Careers of Two Early Math Majors...

Every Tech math major knows the experience of having to explain the field's usefulness to a well-meaning friend or relative. Typically the person will ask, "What are you going to do with it? Teach?" Students who flinch at this question would do well to talk with Mr. Bill Lyons and the Rev. Woody Bartlett, both among the first to earn math degrees from Tech in 1956. The native Atlantans and lifelong friends pursued diverse career paths that were strongly influenced, often in surprising ways, by their years in the School of Mathematics.

The two friends switched to math during the winter quarter of freshman year, after Lyons saw an announcement for a new major and excitedly told Bartlett. Lyons's switch from electrical engineering was motivated by fascination with an emerging new technology. "I had been reading about computing in *Scientific American*," he said, "and the first big electronic computer at Tech was going to the School of Mathematics."

Lyons did learn a lot about computing, laying the foundation for a career at IBM. But more importantly, he learned how to think abstractly. While most of his Tech studies were quantitative in nature, the upper level math courses were set apart by the intuitive thinking they elicited. "You didn't just calculate an answer," he said. "You intuited an answer and then you went back and proved it."

This type of intuitive thinking also served Bartlett, who came to math from mechanical engineering. In his later work as an Episcopal priest while heading up a non-profit organization that provided housing for the homeless, he was forced to learn complex financing rules needed to keep buildings operational and a positive cash flow. "It wasn't just a learning curve: it was a learning perpendicular," said Bartlett, who went from never having used Microsoft Excel to managing 20–year spreadsheets. Ultimately it was his math training, Bartlett said, that allowed him to build a prosperous operation with a 75 percent rate of keeping people off the streets. "Georgia Tech taught me to think rigorously and logically in a way that I don't know you can get anywhere else," he said.

For Lyons, his Tech education, particularly knowledge of thermodynamics, opened the door to a post-graduation adventure, as the military shipped him to MIT for meteorology training. While dismayed that its locals also referred to the famous Massachusetts institute as "Tech," he enjoyed studying under Edward Lorenz, whose work led to the development of chaos theory. It was a heady time for technology in general.

"That was the year they launched Sputnik," Lyons said. "We would go out on the beach at night to watch it go by. You should have seen the lights in our professors' eyes!" he said. "They knew those satellites were going to give them pictures of what the weather was really like."

Bill Lyons

Next, Lyons joined the Strategic Air Command's meteorology team, at the height of the cold war. "We had to calculate crosswinds and tailwinds for every route that every SAC bomber might fly in an emergency, every 24 hours." It was up to Lyons to write a computer program to help automate this process. He said the degree of independence he received was exhilarating, and also spared him some occasional embarrassment. "I was sitting by myself. My program wasn't working right. It took me two or three days to figure out the problem: I was using planar coordinates instead of spherical!"

Though Lyons's career has included many adventures, he emphasizes the pervasive theme of teaching, offering a counterpoint to those who would write off the teacher's role as limited or pedestrian. "Actually, a very large part of my life after Tech was spent teaching, at Lockheed, the Air Force, IBM, and others," Lyons said.

Similar to the School of Mathematics' current practice of enlisting high-performing upperclassmen as teaching assistants, Lyons taught freshman math as a senior. Though his later teaching focused on public speaking and computer-related topics, rather than math, Lyons views his TA stint as foundational. "In classrooms, in large auditoriums, one-on-one and in many other forms," the Tech experience was never far from his mind. "I'm sure Woody would tell you the same."

Bartlett also served in the Air Force, doing computer work for the intelligence division. In 1959, Bartlett was "in the middle of the preparations necessary to receive new data from the first spy-in-the-sky satellite. It was quite a push and very interesting," Bartlett said.

Bartlett is able to look back and see a theme to his entire life, namely the question "How do things work?" As a Boy Scout collecting merit badges, it was "How does a car differential work?" he said. As a priest trying to counsel his parishioners, he asked himself, "How do people work?" Later in combating poverty and homelessness, the question became "How do society and public polices work?"

Bartlett's current work involves environmentalism and evolution. In 2003 he published a book, "Living by Surprise", that explores ecology and environmentalism from a Christian viewpoint, challenging readers to take a more active role in caring for the planet. He calls this current work the "most satisfying" of his career. Because both faith and science are involved, "It brings my two lives together," he notes.

While their days at Tech were filled with hard work, both men also recall plenty of good times, even in the classroom. Lyons recalls the keen sense of humor of an instructor named Mr. Brooks, who taught students about slide rules using his 10-foot
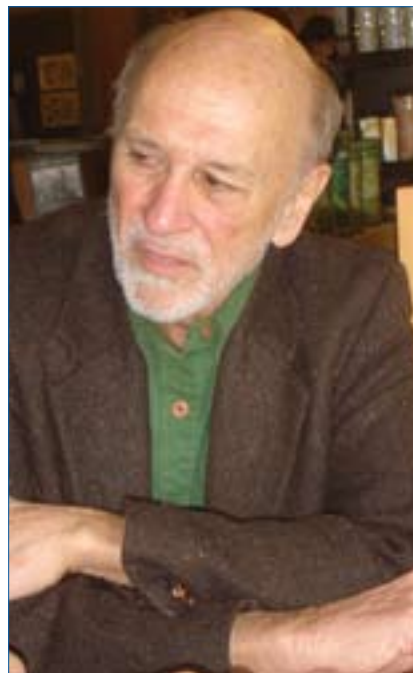
Woody Bartlett

continued Proofs and Punchcards

wall-mounted version. Demonstrating how to approximate the square root of 49, Lyons says, "Brooks squinted his eyes as he peered at the crosshair, and said slowly, 'This appears to be approximately 6.998. For all practical purposes we would call it 7."

Another memorable professor was "Boot Camp" Bailey. Lyons recalls that after another instructor had done a terrible job with the first quarter of differential equations, Bailey came to the rescue in the second quarter. "He taught us the first quarter's material in the first two weeks, then proceeded with the second quarter," Lyons said.

Bartlett and Lyons's undergraduate years coincided with many landmark moments for the Tech community. They watched the current library's construction and grand opening, participating in an assembly line called the "book brigade," to help move books from the previous location. They saw a 19–game football winning streak, and a season in which the basketball team beat vaunted University of Kentucky twice. Remarkably, in those days the head basketball coach doubled as a physical education instructor.

When asked to advise today's undergrads on how to get the most of out the Tech experience, Lyons offers "Don't be a bookworm!" giving himself and his good friend as examples of students who embraced extracurricular activities. Both men were members of the Sigma Chi fraternity. Lyons was in student council and led the Air Force ROTC drill team. Bartlett participated in the Toastmasters public speaking club and served as editor of the Blueprint yearbook. Hard work and balance, Lyons concludes, should be the goal. "Be brilliant, do your best to make good grades, but don't let that be it."

Alan Diaz

Striking a philosophical note, Bartlett offers: "Remember that all things are connected and that there is one central truth that can be approached through mathematics or physics or even theology. Strive for that truth."

—Alan Diaz
Alan is a graduate student in the School of Mathematics. He has previously studied literature and physics, and worked as a print journalist.

Alumni Memories and News...

• Bill Lyons (BS Applied Mathematics 1956)

Reading about Bob Kasriel reminded me of some very special professors—Bert Drucker and Marvin Sledd, former directors of the School of Mathematics (SOM). Bert came to Tech to be the primary computer professor, so I spent many hours with him. Marvin Sledd, who taught the honors math classes early on, was my advisor when I was a student instructor my senior year.

I recently reconnected with George Cain. I first knew George when we worked together at Georgia Lockheed in 1956–57. He had come from MIT, which I later learned, to my dismay, was also called "Tech". One project we shared at Lockheed was the development of the "parts programming" software for the first industrial use of a numerically controlled milling machine. Together we visited his "Tech" to learn techniques for commanding the machine to properly cut curved lines and mill surfaces. As we perfected the programming and needed to actually mill a part, we were confronted with the following dilemma: our punched card output from the IBM 704 needed to be converted to the paper tape input of the milling machine. Fortunately, I was familiar with paper tape, the media of the "monster" ERA 1101 at my "Tech" which had been the precipitator of my switch to the Mathematics Department.

We worked out a Rube Goldberg solution to marry the various systems and successfully produced a tape to mill a part. We were horrified to see the part produced with a large, inappropriate gouge across the middle. Fortunately for us, it was not a computer programming error, but a parts programmer's error, simply a misplaced minus sign!

• George Cain (MS Applied Mathematics 1962, PhD Applied Mathematics 1965, Instructor 1960–64, Assistant Professor 1965-2001, Assistant Director of the SOM 1973–1978, Professor Emeritus 2001)

I began attending classes as a graduate student at Tech in the Fall of 1958 while I was still a full-time Lockheed employee. I pretty much came in from Marietta for classes and went back afterwards. One of my first teachers was Jim Osborn. The department was still housed in the Old Shop building when I was in his class. I'm pretty sure the move to the new building didn't come until the next year, however, the move certainly was prior to my start as a full-time

Bill Lyons
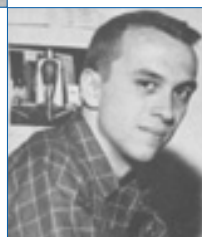
Woody Bartlett

George Cain

continued Alumni...

Ernest Hemingway and George Cain

graduate student in the Fall of 1960. My office was Room 206, now occupied by Liang Peng.

Editorial Note:
Check out www.home.earthlink.net/~g.cain2/ECNHB the East Cobb New Horizons Band. George now plays clarinet with this group.

• David Haley (BS Applied Mathematics 1963, MS Applied Mathematics 1965)

You have a little form at the end of ProofReader asking what I'm up to...Nothing, thank you! I moved to Maryland a year after getting my MS at Tech in 1965, graduated with my doctorate (again in Applied Mathematics) from the University of Maryland in 1970, got married in 1975 and have been here ever since. I retired from the Applied Physics Lab about three years ago, immediately forgetting how to spell ODE, quaternion, covariance, integrate, orbital elements, etc., etc., etc., and am now concentrating on reading, raising azaleas and "scritching" Beagles.

David Haley

• Bill Wise (BS Applied Mathematics 1970, MS Applied Mathematics 1972, Currently at IBM)

I especially enjoyed reading about what has happened to a few of the professors I had while there (1966–1972) and the articles about the lives of Dr. Kasriel (whom I never had for a class) and Dr. Robinson with whom I had five honors classes my freshman and sophomore years. In fact it was my class that presented him with the plaque that read "Best Damn Prof". We also presented him with a cake that read "Happy Buzzards' Day" since he introduced us to the annual "Buzzards' Day" held every March 15 in Hinkley, Ohio.

Bill Wise

• Glenn James (MS Applied Mathematics 1984, PhD Applied Mathematics 1990)

I retired from the Air Force (after 20 years and 20 minutes of service) in 2002, and enjoyed a few years of government consulting before my appointment to the University of the Incarnate Word, Texas' largest Catholic university. I now serve as Dean for the School of Mathematics, Science and Engineering. Life in San Antonio is fantastic, with my wife Pat, who's now a certified bilingual K-4 teacher, and my two college-aged children.

Glenn James

My heartfelt thanks to the good doctors Duke, Harrell, Herod, Meyer and Dieci, all of whom spent at least one silver bullet on my behalf to get me to my PhD finish line!

• Danny Arrigo
(PhD Mathematics 1991)

Congratulations to Danny Arrigo who received a Mathematics Association of America (MAA) 2008 Distinguished Teaching Award from the Oklahoma-Arkansas Section of the MAA! Danny is an associate professor of Mathematics at the University of Central Arkansas.

• Miles Stoudenmire (BS Applied Mathematics 2005)

I'm currently a grad student in physics at UC Santa Barbara working on condensed matter physics theory. As a former TA, it was great to see a bunch of my former students featured in the newsletter. I just published my second major paper with my advisor this spring (2009).

Where are they now?

Photograph from SOM alumni Shobhana Murali and Ted Stoyanov's wedding in 2002. L to R: (back row) Armel, Hamed (front row) Kasso and wife, Rookhy, Jose, Martial

Kasso Okoudjou

• PhD Mathematics 2003—Christopher Heil, advisor
• MS Electrical and Computer Engineering 2003
• Assistant Professor, Department of Mathematics University of Maryland

Armel Kelome

• PhD Applied Mathematics 2002—Andrzej Swiech, advisor
• Lecturer and Chief Advisor, Department of Mathematics and Statistics McGill University

Hamed Maroofi

• PhD Applied Mathematics 2002—Wilfred Gangbo, advisor
• MS Electrical and Computer Engineering 2001
• VP, Quantitative Finance Analyst Bank of America

Jose Figueroa-Lopez

• PhD Applied Mathematics 2004—Christian Houdre, advisor
• MS Quantitative and Computational Finance 2002
• Assistant Professor, Department of Statistics Purdue University

Martial Agueh

• PhD Applied Mathematics 2002—Wilfred Gangbo, advisor
• Assistant Professor, Department of Mathematics and Statistics University of Victoria

Staff Profile: Sharon McDowell
Academic Assistant, Academic Programs Office...

Sharon with Dr. Gary Schuster

A native Atlantan, Sharon McDowell studied management, computer science, and business administration at Georgia State University and Clayton State College before coming to Georgia Tech in 1984. She served as an academic assistant and secretary to the Dean in the College of Management prior to joining the School of Mathematics (SOM).

Sharon has served the SOM with distinction since her initial appointment as a Staff Assistant for the Quantitative and Computational Finance (QCF) program. For three years, 2003 through 2006, Sharon provided invaluable support for Dr. Bob Kertz, the founding Director of the QCF program, and helped to establish and define the administrative support role for the newly established program.

With Dr. Kertz' retirement and the transfer of the administrative support function for the QCF program to the College of Engineering, the SOM has been able to benefit from Sharon's expertise applied to a new role, that of providing administrative support for the academic programs. Again, Sharon helped define the position.

Prior to this time, the School did not have an established academic programs office and students were sometimes frustrated in their search for assistance. A major paradigm shift was needed: to create such an office where students could always go for guidance. From the outset, Sharon jumped right in, determined what needed to be done, and did it. Her ready smile and "How can I help you?" attitude is a winning combination when it comes to dealing with students as well as faculty and staff in the SOM.

In April, Georgia Tech recognized her considerable talents and contributions, and awarded Sharon McDowell the 2009 Outstanding Staff Performance Award. This prestigious award is issued to only five extraordinary staff members from across campus each year.

Dr. Enid Steinbart, the SOM Director of Undergraduate Advising and Assessment wrote the following in support of Sharon's nomination:

"Sharon is a huge asset to the undergraduate mathematics program, making things work smoothly. She brings a great attitude and a cheerful disposition to every task. She works hard, skillfully managing the many requests that come from others and me. She does an outstanding job, completing projects promptly and professionally. Sharon makes coming to work a very positive and productive experience."

Annette Rohrs, the SOM Web Author and a winner of the 2005 Outstanding Staff Performance Award, added:

Mr. and Mrs. Jerome McDowell

"Sharon is simply a superb co-worker. She is dependable, willing and always pleasant. Sharon volunteers to help even without asking; she sees the good in people. No job is too insignificant for her to perform. She is so efficient that most of the time the job has been done even before asking."

Mitch Keller, a SOM graduate student and organizer for the High School Mathematics Competition (HSMC) shared this about Sharon's volunteer efforts with the annual HSMC:

"Sharon has been a wonderful help with the HSMC. Her organizational skills have been impressive and kept us all going. She has also been able to bring a different perspective to the table: that of a parent of a school-aged child. This perspective has helped ensure that the HSMC's organization and operation best fit our audience. I always get the feeling that Sharon cares a lot, whether it be about the HSMC organizers personally or professionally or about the students and their teachers and parents who attend the competition."

Christopher Stevens, an applied mathematics undergraduate student said, "I think of Ms. McDowell almost as an auntie. If you are having trouble with something, she is there to listen and most of the time she will come up with a solution, and if she does not, you at least leave feeling better about yourself."

Outside of Georgia Tech her principal interests are her family and her church, where she teaches both adult and children's Sunday School. Sharon and her husband Jerome are proud parents of Christine, a recent graduate from Northgate High School, who will attend Savannah State University this fall.

Christine and her mom at the HSMC!

In addition to her expertise, skill and dedication, we all appreciate Sharon's attitude. In her own words, "I've worked with students, faculty and staff, but the most rewarding is serving students. My goal is to make every student feel that someone really cares. My greatest joy is to serve others."

Sharon McDowell is clearly the heart and soul of the School of Mathematics.

The Graduate Program...

For the academic year of 2008-2009, the School of Mathematics (SOM) was home to 116 full time graduate students and to 26 part-time graduate students. In Fall 2008, we welcomed 36 new graduate students, and 9 of those were women. During the past three commencement periods (Summer and Fall 2008, and Spring 2009), 31 graduate students earned a Masters degree and 13 graduate students earned their PhDs. Of the 31 Masters, 13 in Mathematics, 16 were in Quantitative and Computational Finance (QCF) and 2 in Statistics. Of the 13 PhDs, 10 were awarded in Mathematics and 3 in Algorithms, Combinatorics and Optimization (ACO).

Our graduate programs continue to attract a large number of extremely talented and ambitious applicants from all over the world. For the upcoming fall semester, we received over 150 PhD applications and 270 Masters applications (200 to the QCF program alone). The number of applicants to the Masters program in Mathematics nearly doubled from the previous fall.

As a result, we project that we will have a record number of entering graduate students in Fall 2009. We expect a large entering class of Masters' students: 5 in Mathematics, 2 in Computational Sciences and Engineering (CSE) and about 20 in QCF. We are also expecting 17 new doctoral students spread across three of our doctoral programs: 10 in Mathematics, 4 in ACO and 3 in CSE.

Our doctoral students are doing wonderfully and are receiving both external and internal recognition for their hard work. Even in this tight job market, our graduates are finding employment in prestigious post-doctoral positions as well as in industrial settings.

Students who have just completed, or will have completed their PhDs by the end of Summer 2009, have received post-doctoral positions at the Courant Institute, the Fields Institute, the NSF Institute at Ohio State and the Chinese University of Hong Kong.

Recent graduates are obtaining prestigious fellowships and current students are receiving fellowships, prizes, and accolades.

External Awards and Recognition:

• Alan Diaz (MS Mathematics) was selected to be a Mathematics Instructor in the Georgia Governor's Honors program this summer.

• Mitch Keller (PhD Mathematics) won a Future Leader Award given by the Association of American Colleges and Universities. This award recognizes graduate students who show exemplary promise as future leaders in higher education, who demonstrate a commitment to developing academic and civic responsibility in themselves and others, and whose work reflects a strong emphasis in teaching and learning. Mitch is the only one in the field of Mathematics to be selected among the ten winners nationwide. In fact, no past winner (2006 to present) has been a graduate student in Mathematics, which makes Mitch's selection all the more impressive and important.

• Adam Marcus (PhD ACO, 2008) won an NSF Post-Doctoral Fellowship.

• Luke Postle (PhD ACO) was awarded an NSF Graduate Fellowship.

• Carl Yerger (PhD ACO) won a prize for student speakers at the 32nd SIAM South-Eastern Atlantic Section Conference.

Campus Awards and Recognition:

• Georgios Amanatidis (PhD ACO) was the SOM's nominee for the 2009 CETL/BP Outstanding Graduate Teaching Assistant Award.

• Adam Marcus (PhD ACO, 2008) won a "Sigma-Xi Best PhD Thesis Award". Adam joins five SOM alumni who have won this award: Kasso Okoudjou (PhD Mathematics, 2003), Demetrio Labate (PhD Mathematics, 2000), George Donovan (PhD Mathematics, 1995), Almut Burchard (PhD Mathematics, 1994), and Michael Freedman (PhD Mathematics, 1979).

• Selma Yildirim-Yolcu (PhD Mathematics) won the 2009 CETL/BP Outstanding

Graduate Student Serving as Instructor of Record Award. She is the first graduate student to win this prestigious campus wide award given by the Center for Enhancement of Teaching and Learning (CETL).

School of Mathematics Awards:

I would like to acknowledge and give my heartfelt thanks to all of our graduate students who have shown dedication to Mathematics and to their duties in an exemplary manner. This past year, outstanding nominations were received for all award categories reflecting the high level of achievement of our graduate students.

- Festa Fellowship Award:
  Carl Yerger

This award, sponsored by Mr. and Mrs. John Festa, recognizes the Mathematics Graduate Student who has shown superior academic and leadership skills.

- Best PhD Thesis Award:
  John Pearson
  Alessandro Pugliese
- Outstanding Teaching Assistant Award:
  Shannon Bishop
  Ian Palmer
- Top Graduate Student Award:
  Alex Grigo
  Hwakil Kim

The last three awards above are sponsored by the SOM faculty, which has again generously supported the graduate program.

If you would like to support the SOM Graduate Program, please consider contributing to our SOM Graduate Students Fund: #370000074. Also, if you would like to endow a specific fellowship or award, or to create a new one, perhaps targeting a specific segment of our students' population or students specializing in a specific field of Mathematics, please let us know. For more information on donating to the School of Mathematics, you may contact Christy Dalton SOM Financial Manager, at 404-894-0773 or by email at cdalton@math.gatech.edu.
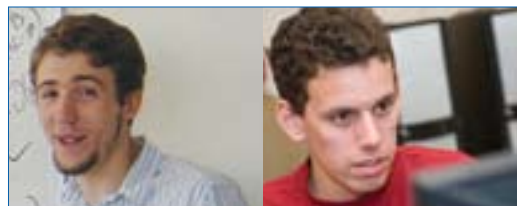
Thank you!

—Luca Dieci
Graduate Coordinator

Alan Diaz and Mitch Keller

Luke Postle and Carl Yerger

Georgios Amanatidis, TA Coordinator
Klara Grodzinsky, Laura Stiltz and Selma
Yildirim-Yolcu

John Pearson and Alessandro Pugliese

Alex Grigo, Luca Dieci and Hwakil Kim

Ian Palmer, Luca Dieci and
Shannon Bishop with Teena Carroll

Graduate Profile: Shannon Bishop, PhD in Mathematics...

Shannon Bishop

Shannon began her undergraduate studies at the University of Alabama in a premed program. While there, her calculus professor encouraged her to major in mathematics and she followed his advice, graduating in 2005. As she and her husband Daniel (who had also completed his bachelor's degree at the University of Alabama) began looking for graduate programs, Shannon was in contact with a Georgia Tech graduate student, Teena Carroll (PhD in Mathematics, Spring 2008). Teena gave her some good advice about student life and graduate programs, so Shannon and Daniel decided to come to Georgia Tech and entered in the Fall of 2005. Daniel is currently a PhD student in the School of Electrical and Computer Engineering.

Shannon has found the School of Mathematics (SOM) to be a good match for her in terms of academics, research, professional development and peer group. She appreciates the fact that the SOM encourages graduate students to start doing research early in their graduate careers and admires her research advisor, Dr. Chris Heil.

She said, "Dr. Heil is the best advisor. Of course, everyone he meets knows that he is a very affable person. He has never made me feel that I am a bother (even though I am). He critiques and assesses my work but I never have a sense that I am being judged. Dr. Heil's advice is always useful. I would be lost without our weekly meetings. This year he provided very detailed feedback on numerous drafts of the first paper I wrote. I had no idea how much writing and editing was required to turn a few theorems into a journal article ready for submission, but because of his feedback I have a much better understanding of the process of crafting a manuscript. Dr. Heil has also taken steps to assist me with my future job search. He has arranged funding for me to attend a number of conferences and has introduced me to many colleagues."

Professor Chris Heil shared the following:

"Shannon is my fourth PhD student, and it has been a lot of fun working with her. When she started doing research, we were trying to understand the nature of redundancy in infinite-dimensional settings. In many situations, redundancy can be a good thing. You don't actually want to have a basis for your space but you want an overcomplete system that is resilient to losses, perturbations, noise, etc., or for other reasons it is simply too much to ask for unique representations.

One direction of Shannon's work dealt with quantifying the idea of redundancy. A redundant system has 'extra elements', but to quantify what this means is surprisingly difficult and deep. Shannon's first work addressed this question for the case of redundant wavelet frames, and resulted in her first publication.

In another direction, redundant representations can be useful for analyzing operators. We have been especially interested in time-frequency and time-scale representations, in part because of modern applications to wireless communication and other areas. Time-frequency representations are connected to pseudodifferential operators, which in the engineering context correspond to time-varying filters or narrowband communication channels and in the mathematical context are pseudodifferential operators. Shannon's recent work has dealt with these operators and with their time-scale, or wideband, analogues. In particular, she found a number of interesting connections between affine pseudodifferential operators and Radon and ridgelet transforms which have led to two additional papers that have been submitted and are under review.

Shannon is a wonderful person, and I've been very happy that she chose to work with me. She's accomplished a great deal both in research and in her teaching assistant (TA) duties, yet is always modest about her work. She has a very bright future ahead of her."

Teaching is also important to Shannon. She has taught many freshman and sophomore level classes as both a recitation TA and a lead TA, and has served as a mentor for newly arrived graduate teaching assistants. As a member of the SOM lead TA network group, she meets with the group monthly to discuss learning and teaching issues for instructors of record.

Klara Grodzinsky, TA Coordinator, said, "Shannon has been a good teacher and departmental citizen. She has helped run TA Development seminars and conduct classroom observations and has participated in every teaching enrichment activity that has been offered to the SOM TAs. Shannon always receives high marks on the end of term student evaluations both as a lecturer and as a recitation instructor."

In addition to her classroom teaching, Shannon is also an active volunteer tutor in a number of Atlanta area programs. She has tutored children at My Sister's House, a women and children's program of the Atlanta Union Mission, and school children who are academically at-risk in the City of Refuge program.

Shannon's advice to new students is: "Look ahead once a semester to make sure that you are on track to achieve your academic goal." Certainly, Shannon has looked ahead!

Dr. Chris Heil and Shannon Bishop

Graduate Profile: Craig Sloane, PhD in Mathematics

The graduate academic environment is such an attractive place to be because of the diverse background of students. There are younger ones who continue their studies right after earning a bachelor's degree, but there are others, who after some professional training, return to graduate school.

Craig Sloane is one such student. After a career as a corporate lawyer, he returned to school for a PhD in mathematics. Craig is married to Donna and they have two children, Nico who is seven years old and Jack who is five.

Below is a recent interview conducted by Michael Loss, Craig's thesis advisor:

ML: Why did you return to graduate school as a mathematics major?

CS: Because I wanted to. This is more about doing something I enjoy than about anything else. When I was younger, I was talented in math and had competed at the national level in math competitions. I had even considered a grad program in mathematics before going to law school.

ML: Why did you move out of corporate law?

CS: Didn't enjoy it. A lot of hours, and I didn't feel like we always did the right thing.

ML: Does being in the graduate school have any impact on your family, good or bad?

CS: My family is extremely supportive, in many ways beyond that of other grad students I have spoken with. Notwithstanding, my kids sometimes ask when I'll be "done with my homework," and since I am only doing research now, it is hard to explain that it doesn't really ever stop.

ML: What are the advantages and disadvantages of being older than other students?

CS: I have very good time management skills, which often seem to get better with age. Also, I am not as pulled by social needs as I was when I was younger since I am married, have a family, and most of my friends have demanding jobs and families as well.

The disadvantages are that I make connections a little more slowly and my memory is not as good. In high school, I had a photographic memory. Now, I tend to forget things, especially when they aren't important to me. Anyway, these factors made taking exams, when I still had to take them, much more difficult.

ML: Do you feel overly challenged, challenged or not challenged?

CS: Well challenged. I don't recall ever feeling overwhelmed by anything, but other than a couple of courses, nothing has been easy either.

ML: How important is teaching for you?

CS: I enjoy it a lot, and it is very important for me to teach well. I think teaching is a skill that is extremely hard to master. Even many of those who care about their teaching still approach it, in some ways, from the wrong perspective.

Ultimately, it is not about how we test the students, or how we grade them, or what subjects we teach them. It is whether we prepare them for the work they will need to do in their chosen field. The grade a student receives may or may not really reflect whether they are capable of using the coursework.

The first step is relating to the students. While taking CETL courses and spending loads of time preparing syllabi, websites, and learning about teaching methods can be helpful, for me, the time is better spent talking with the students.

All that said, although I take teaching very seriously, and I enjoy it immensely, I don't see myself teaching after graduation, however, I believe I would like to return to it after working for a number of years.

ML and CS

The Undergraduate Program...

By all measures, our Undergraduate Program has had another excellent year. Our enrollment increased from 138 students last spring to 150 this spring with 40 in Discrete Mathematics and 110 in Applied Mathematics. Fourteen students are Spring 2009 degree candidates.

The achievements of our faculty notwithstanding, the main contribution to the intellectual life in the Undergraduate Program often comes from the students themselves. Therefore we are sorry to see them leave but at the same time we are happy to see them take the next big step in their lives, either by going to graduate school or by working towards a professional career. Here are a few examples…

• Cindy Phillips will attend graduate school in the Mathematics Department at the University of Arizona in Tucson.

• Fei He has been accepted to graduate school at UC Riverside.

• Jonathan Eisen will be working for Northrop Grumman Corporation, Electronic Systems, as a System Engineer in their Professional Development Program.

• Patrick Poole successfully finished his double major in physics and applied mathematics.

The vigor and dedication of our students is also reflected in the awards they receive, either for outstanding academic achievement, excellent teaching or exemplary leadership. To mention the most recent recipients…

• AJ Friend received the Phi Kappa Phi Cup, the top academic honor that Georgia Tech awards to graduating seniors. The minimum requirement for receiving this honor is a 4.0 GPA. This year there were 39 students institute wide with a 4.0 GPA. AJ was chosen as the winner based on his research accomplishments. Previous School of Mathematics (SOM) winners of this honor were David Vener (2001) and Blair Dowling (2002).

• Laura Stiltz won the CETL-BP Outstanding Undergraduate Teaching Assistant Award, presented by the Georgia Tech Center for the Enhancement of Teaching and Learning. Laura was also the chair of Georgia Tech's 2008 Women's Leadership Conference, and she won the Women's Resource Center annual 'Make A Difference' Award. Laura will be studying in the College Student Affairs Administration program at the University of Georgia for the next two years.

• Nicole Larsen is one of our highest achieving students. She finished her studies at Georgia Tech with a BS in Applied Mathematics and a BS in Physics, and was accepted to graduate school in Physics at Yale. Nicole has been involved in two research projects, one with Christine Heitsch of the SOM

Cindy Phillips

Jonathan Eisen

Patrick Poole

AJ Friend

Laura Stiltz

Nicole Larsen

continued Undergraduate Program...

Fall 2008 (L to R) AJ Friend, Kevin Sluss, Fei He, Cindy Phillips and Patrick Poole

enumerating RNA structures and another one in Physics. Nicole got an Honorable Mention in the Schafer Prize, awarded by the Association of Women in Mathematics, and she is also the recipient of the Senior Mathematics Prize from the SOM.

• **Stefan Froehlich**, a senior in physics and applied mathematics, received the Undergraduate Mathematics Prize from the SOM. He has an outstanding record in his courses as well as in his research conducted under the supervision of Prasad Tetali.

• **Daniel Connelly** received the SOM Outstanding Undergraduate Teaching award. (See the undergraduate student profile in this issue.)

Our congratulations and best wishes to all of our awardees!

Another high point for our undergraduates was the 2008 Putnam Competition. As he has for many years, Matt Baker taught his problem solving class during the fall semester. On a Saturday in December about 20 or so students took the Putnam exam, spending a total of six hours solving mathematical problems. You may recall that this is a nationwide exam with about 4000 students participating. The problems are really difficult and the median score is zero. Our team of students placed 21st out of 545 teams!

The six students listed below got more than 15 points which is an absolutely superb achievement. Congratulations to all that participated!

- Dragos Ilas (32)
- William Drobny (30)
- Stefan Froehlich (24)
- Patrick Brandt (21)
- David Hollis (21)
- Aisha Arroyo (18)

Georgia Tech is one of the premier technical universities in the country, and is, relatively speaking, a bargain for in-state students. Still, in order to attract outstanding students, the SOM offers scholarships sponsored by a grant from the National Science Foundation. We present these scholarships to prospective students of varying backgrounds.

This year we offered 14 scholarships of $2,500 each and 4 scholarships of $5,000 each to prospective students. Likewise, we try to recruit students through our annual High School Mathematics Competition (HSMC). The HSMC experience, hopefully, puts Georgia Tech and the SOM on their minds. We have been able to award scholarships to the winners of these competitions, but future funding for these scholarships is in question.

Besides the scholarships, an NSF grant supplies funds to support the Research Experience for Undergraduates program (REU). In this program, undergraduate students team up with professors to work on research projects over the summer and receive a stipend to cover their expenses. The first contact with research is one of the most important experiences in a math student's college level education. By creating questions on their own, students tend to learn mathematics in a much more profound way.

As in previous years, Matt Baker is again coordinating the REU program this year. The sixteen student participants come from a variety of institutions. Nine of them are from Georgia Tech, two from Agnes Scott College, one from Georgia State University, one from Spelman College, one from Emory University, one from the University of South Carolina and one from Florida A&M University.

Many thanks to Matt for organizing this important endeavor and to all the participating faculty who are so generous with their time.

The success of a good undergraduate program is largely measured by the opportunities it provides

for the students to reach their goals and how well the students do in reaching those goals. Our wonderful faculty and staff in the SOM, however, also drive their success. In particular, I would like to recognize the undergraduate program team…

Enid Steinbart, Director of Undergraduate Advisement and Assessment, with her deep knowledge of mathematics and of the curriculum, does a phenomenal job in helping students to fulfill their potential. At student request, Enid initiated a very successful student seminar, where students and faculty give talks and students write reports.

Rena Brakebill, Assistant Undergraduate Coordinator, with her unmatched knowledge of the ins and outs of Georgia Tech, has been crucial to the functioning of the Undergraduate Program and to the whole school as well. Rena will retire at the end of the summer and the story of her career at Georgia Tech will be told another time. It definitely needs more space.

Luz Vela-Alevaro will succeed Rena. Luz has a PhD in mathematics from CalTech and has been teaching in the SOM for a number of years. For the past year, she has worked with Rena and proven herself to be an excellent choice for the demanding job of scheduling classes.

We are also very happy to have Teaching Assistant Coordinator Klara Grodzinsky who, with help from Cathy Jacobson, ESL Consultant for International TAs, runs the award winning TA Development Program. Being a TA is a great way to deepen one's knowledge of mathematics and it also carries the responsibility of being a good teacher. While this might not be initially clear to some students, it certainly will be once they have gone through Klara's training seminar. In fact, the majority of the above-mentioned students and alumni all served as Mathematics TAs!

Last but not least, I would like to mention Sharon McDowell, Academic Assistant, who received a Georgia Tech 2009 Outstanding Staff Performance Award. Her presence in the school has had such a positive impact that we decided to feature her in this issue of our newsletter. (See Staff Profile.)

As of Fall 2009, Doron Lubinsky will take over as Undergraduate Coordinator. Doron is a fantastic teacher; he is the 2008 recipient of the Eichholz Teaching Award and there is no doubt in my mind that the Undergraduate Program will improve even further under his tenure.

—Michael Loss
Undergraduate Coordinator

Dr. Maria Westdickenberg with REU students
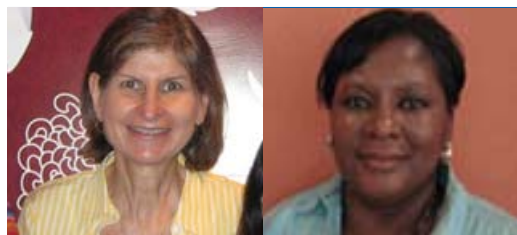
Enid and Sharon

Rena and Luz

Klara and Cathy

Doron

Undergraduate Profile: Daniel Connelly
BS Applied Mathematics, Spring 2009

Daniel (Dan) Connelly did not enter Georgia Tech in 2005 planning to major in mathematics. However, he leaves Georgia Tech in May 2009 proudly bearing a BS in Applied Mathematics with a Computer Science (CS) Minor and Faculty Honors. Dan's original choice of majors was not mathematics, nor was it his second. Or third. In fact, Applied Mathematics was his fifth major in as many semesters. After several semesters of exploring various options, Dan decided that he truly enjoyed mathematics the most.

Once Dan joined the ranks of the mathematics majors at Georgia Tech, he became fully engaged in the undergraduate mathematics program and the mathematics community. In the spring of 2008, Dan undertook undergraduate research with Dr. Saugata Basu studying Coxeter groups, a topic in abstract algebra. In the summer of 2008, Dan participated in the School of Mathematics Research Experiences for Undergraduates (REU) that was funded by the National Science Foundation. He worked with Professor Matt Baker on a project that incorporated computer science (one of Dan's former majors) and mathematics. Dan describes the REU experience as "awesome" and highly recommends the program to others, especially those thinking about graduate school. He feels that the combination of the mathematics major, CS experience and the CS minor gives him more options in his career path and elevates him

above other applicants. He is considering graduate school in CS sometime in the future.

In summer 2009, Dan will begin work at the MIT Lincoln Laboratory, a federally funded research and development center chartered to apply advanced technology to problems of national security.

Dan claims that the best thing he did in college was to become a mathematics Teaching Assistant (TA). He was a TA for four semesters (calculus and differential equations) and earned respect and appreciation for a job very well done from students, fellow TAs and faculty. In fact, he was selected to receive the School of Mathematics 2009 "Outstanding Undergraduate Teaching Assistant" award. Dan attributes a part of his memorable experience to "the great group of people in the undergraduate TA office."

"Dan truly epitomized an outstanding TA," writes TA coordinator Klara Grodzinsky. "He offered to help above and beyond the call of duty, often giving review sessions that lasted for several hours and assisting with the recruitment of new TA's. From his high evaluations, it is clear that Dan has made a positive and lasting impact on his students, lead instructors, and fellow teaching assistants."

Besides undergraduate research activities, teaching activities, and coursework, Dan has been an exemplary School of Mathematics citizen. He volunteered to work in the annual GT High School Mathematics Competitions and served in the Student Government Association. Dan was one of four Team Leaders for "GT 1000: Introduction to College Life" in a section limited to freshman Applied Mathematics and Discrete Mathematics majors. They benefited from his experienced insights into mathematics and life at Georgia Tech.

Dan admits that it took him a few semesters to become involved in various activities at Tech, but his advice to undergraduates is, "Become involved!"

-Enid Steinbart,
Director of Advisement and Assessment

Georgia Tech High School Mathematics Competition

On February 28, 2009 a rainy Saturday, 359 students participated in the fifth annual Georgia Tech High School Mathematics Competition (HSMC). The sixth though twelfth graders came from 72 schools representing 25 Georgia counties as well as California, Florida, Illinois, North Carolina, South Carolina, Ohio and Virginia.

The competition included both varsity and junior varsity divisions. Participants tackled three phases of tests consisting of multiple choice, ciphering and proof-based problems. Both individual and team awards were presented, with top competitors receiving Georgia Tech scholarships ranging from $250 to $2,500.

"We are extremely proud of the knowledge and excellence demonstrated during this annual event," said Georgia Tech College of Sciences Dean Paul Houston. "The High School Mathematics Competition gives us the opportunity to show how much we appreciate these bright students, whom we hope will someday decide to attend Georgia Tech."

The Georgia Tech HSMC, held annually since 2004, is organized by Pi Mu Epsilon, the Georgia Tech mathematics honor society and Club Math, a social organization for students at Georgia Tech with an interest in mathematics. The student organizers also receive assistance from the School of Mathematics faculty and staff.

Our incoming Chair, Dr. Doug Ulmer, welcomed coaches and parents at this event. Several alumni and retired professors attended the meet-and-greet session with Dr. Ulmer, and some stayed to watch the ciphering test.

Visit the HSMC website at www.math.gatech.edu/hsmc for more photographs and lists of winners.

Mitch Keller, Carl Yerger, Michelle Delcourt and Meredith Casey, HSMC organizers

Gwinnett School of Mathematics, Science and Technology Team with Dean Houston

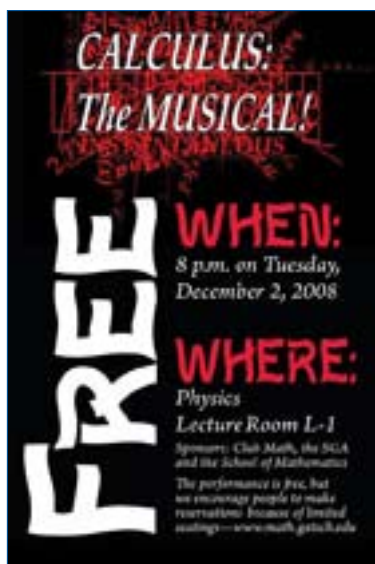Luna Mingyi Zhang, from Wheeler High School and Dean Houston

Varsity Semi-Finalists

Ciphering test pick-up by Club Math President David Lowry

Calculus: the Musical!

In the style of Offenbach's *Galop Infernale* (Can Can)…

> For Maxima and minima
>   just take derivitinima!
> Happiness, now just assess
>   the zero, zero, zero, zero!
> Don't forget you must inspect
>   the endpoints as they are suspect!
> Find the values of our function,
>   look for Highs and Lows!...

-from *MAXIMA and minima* by Marc Gutman, permission granted from KNOW THEATRE.

"Maxima" and "minima", when sung as a rousing "Can-Can" chorus, is fun and easy to remember. On December 2, 2008, Sarah Stevens and Dan Davidson, KNOW THEATRE members from Cincinnati, rocked the mathematical socks off of over 150 students, faculty and friends of Georgia Tech with their performance of *Calculus: The Musical!* The comical, highly entertaining musical review of the concepts and history of calculus provided an entertaining evening for all. The performance was sponsored by the School of Mathematics, the Student Government Association and Club Math, a social organization for students at Georgia Tech with an interest in mathematics.

The musical was born as a teaching tool in math teacher Marc Gutman's classroom. He found that setting formulas and rules to music helped his students learn and retain tricky information. Marc holds a Masters in Mathematics Education from the University of Minnesota.

In February, Club Math's members David Lowry (the president), Alexandria Stephenson and Michiel Shortt performed a couple of songs from the musical at the Georgia Tech High School Mathematics Competition.

Visit calculusthemusical.com for more information, lyrics, audio samples and show schedule.

SOM New Website Up!!!

In June of 2009, the School of Mathematics unveiled our new website. The old site had a lot of useful information; however, it was becoming increasingly more difficult to manage and it employed a number of outdated stylistic elements. Our goal was to improve the look and feel of the site with consistent styling and a more updated design. In addition, we wanted to improve and migrate the content into a more manageable infrastructure.

A committee of faculty, staff and students began reviewing other sites and providing suggestions in the fall of 2007. We sponsored several focus groups with alumni and prospective students. We had a photographer take pictures of people and places around the School. Working with the Institute's office of Communication and Marketing, we considered several mocked up designs. Our computer support group also began to simultaneously explore and test various content management systems that would provide the scaffolding for the new site. We didn't realize how long things would take, but we were confident that, through our careful process, we would end up with a much improved website.

For those more technically minded readers, we'll share a few more details. Our old site included a collection of HTML pages, some miscellaneous PHP code and even some old perl CGI scripts. The new site is integrated into an instance of the Drupal content management system and we have, for the most part, separated the actual content from the themes and CSS. As a result, we expect that future website migrations and redesigns will be much easier going forward.

Although many people worked on this project, we will take this opportunity to highlight the contribution of our lead system administrator, Justin Filoseta. After the overall design and layout were finalized through our work with Communications and Marketing, Justin worked to modify and develop custom Drupal modules and many specific detailed views which were driven by the actual content of our site. He designed and implemented a secure, manageable, robust and flexible system that will allow us to test minor as well as major updates to our site without negatively impacting the primary site. Justin made a very valuable contribution to this project, both through his careful attention to detail as he combed through thousands of lines of code and through his friendly and professional attitude as he helped balance the various expectations and requirements.

Thanks also goes to Annette Rohrs, who has helped tremendously with all aspects of our website for over a decade. Annette was the person most familiar with the content on the old site, and she was extremely adept at finding out which things to migrate and which things we could simply drop. Moreover, she did this all while still supporting the faculty with technical typing and working on NSF proposal submissions!

The migration to the new site is, quite frankly, still a work in progress. We would love to hear your thoughts and comments! Email webmaster@math.gatech.edu.

—Lew Lefton, IT Director, School of Mathematics and College of Sciences

Dr. Enid Steinbart and Dr. Lew Lefton   Annette Rohrs
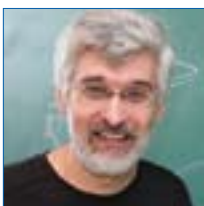
Notes from the ProofWriter

Rena Brakebill

Cathy Jacobson

Michael Loss

Janet Ziebell

Dear ProofReaders,

We have received many positive comments about our inaugural issue...thank you! Many of you shared memories of your years at Tech. Some of these went back in time quite a bit to the era when the School of Mathematics (SOM) was part of the Old Shop; that was more than sixty years ago. Some of you set us straight about the SOM's move to Skiles (it was in 1959 and not in 1958). We were also happy that most of you have forgiven your teachers' idiosyncrasies. This means there is hope that our current students might also think this way about us in years to come.

In this issue we report only about events that happened last year (Summer 2008 through Spring 2009). As we all know, there have been budget cuts and the *ProofReader* was not spared. We have had to reduce the number of printed copies and to further save money we have decided to limit our mailings to U.S. addresses only. Those alumni and friends residing elsewhere can access the electronic copy that will be posted on our SOM website. It is our hope that you will enjoy this issue no matter where you read it!

Talking about the financial meltdown: Some have proposed that the fault is largely with the quants, i.e., us mathematicians. Of course, we reject this opinion. It is a mathematical trivia that the best mathematics is useless for any predictions, if the underlying assumptions are unrealistic or faulty. Thus, the current events serve as a reminder of how we should be educating our students. Mathematics should not be viewed only as a tool kit for solving a bunch of problems, be it from engineering or finances; rather, it is a way of life: It teaches you how to think clearly about what is going on around you. And it makes you humble. You realize how easy it is to make mistakes, and what a miracle it is, when we get things right.

I sincerely hope that the current issue of our *ProofReader* is one such miracle. Working to make it happen were Rena Brakebill who with her boundless resources collected all the material, Cathy Jacobson who brought us stylistically and grammatically up to snuff, and Janet Ziebell who once again created the wonderful layout of the current issue.

And as before, if you have feedback or any story related to the SOM, please let us know about it at editor@math.gatech.edu. We love to hear from you!

—Michael Loss…for the Editorial Team
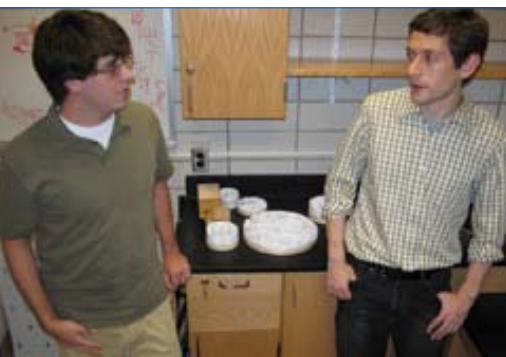
ABOUT THE COVER: The shape is of a thin elastic object (a strip of paper) under confinement from research done by undergraduate Kevin Spears (left) and Dr. Silas Alben (right). Visit people.math.gatech.edu/~alben for more information. Cover drawing and layout completed by Janet Ziebell.

Alumni Classnotes Information Needed

Let us hear from you! What's going on in your professional or personal life?

Name:

E-mail Address:

Degree and Class:

Snail mail Address (New?)

Please send your information and photos to: *ProofReader* Editors, School of Mathematics, Georgia Institute of Technology, Atlanta, GA 30332-0160; or e-mail information to: editor@math.gatech.edu. If accepted, we reserve the right to edit *ProofReader* submissions for length and style.

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Ranked among the top 25 mathematics' departments of all public universities, the School of Mathematics has a solid reputation as a nationally recognized institution for mathematics. Private support for students and faculty is essential for the School to attract the very best and brightest minds needed for improving the quality of research and teaching.

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