

Message from the Chair



Photo courtesy of Nick Cabot

Dr. Dorina Mitrea, Chair
of the Department of
Mathematics

Hello, everybody! It has been a vibrant, action-packed semester, and I am delighted to share with you some of the many remarkable accomplishments and notable events that happened during this time. As you know, in October Baylor celebrated its 100th Homecoming. As a department, we were excited to be part of this centennial edition. On a personal level, I had the distinct pleasure of meeting those of you who stopped by Sid Richardson after the parade.

The department has been (and still is!) in the midst of a flurry of seminars, colloquia, and special lectures involving high-profile speakers. For example, Dr. Luis Caffarelli, the Sid Richardson Foundation Regents Chair at the University of Texas in Austin and a member of the National Academy of Sciences, has delivered two talks in the 13th annual Baylor Lecture Series in Mathematics on Oct. 17 and 18. Dr. John Ewing, former Executive Director of the American Mathematical Society and currently the President of Math for America, has delivered a public lecture on Oct. 15. Dr. Douglas Arnold, the McKnight Presidential Professor of Mathematics at the University of Minnesota, was the speaker in the 12th annual Baylor Undergraduate Lecture Series in Mathematics, scheduled for Dec. 5 and 6.

These lecture series were initiated in 2007 by our previous chair, Dr. Lance Littlejohn, who has been the heart and soul of these events. And for that I wish to thank Lance for his vision and leadership. Funds for these lecture series were made available by the College of Arts and Sciences at Baylor University and we are most grateful to Dean Lee Nordt and Dean Kenneth Wilkins for their generous support. Our department has also

hosted the Fall 2019 edition of the Brazos Analysis Seminar that took place on our campus Nov. 9 and 10. This is part of an ongoing series of conferences that rotate between Baylor University, Texas A&M University, and University of Houston. Our very own Dr. Tao Mei has been the main organizer of this event, with funding from the National Science Foundation (NSF) and participating institutions.

There were also many individual achievements by our faculty and students.

Highlights include: Dr. Jonathan Meddaugh had one of his papers recently accepted for publication in *Inventiones Mathematicae*, one of the finest mathematical journals in the world. Dr. Rob Kirby has been awarded a competitive Collaborative Research NSF grant and he will be visiting the Oden Institute for Computational Engineering and Sciences at the University of Texas at Austin as a J. Tinsley Oden Faculty Fellow. Dr. Andrei Martinez-Finkelshtein has been invited to give a plenary talk at the up-coming SIAM/CAIMS Annual meeting to be held in Toronto in the Summer of 2020.

And, last but not least, one of our undergraduate students, Blake Allan, is the recipient of a 2019 Trjitzinsky Award from the American Mathematical Society –congratulations to Blake!

The gifts from our alumni and friends are of immense value, and permit us to carry on crucial activities for our students and our scholarly work. Your generous support last year made it possible for the Mathematics Department to award scholarships totaling close to \$170,000. For these and many other contributions we are truly thankful. Every one of you is cordially invited to stop by and visit the recently installed Wall of Honor on the third floor of the Sid Richardson Building. This is a project that came to fruition through efforts spearheaded by Dr. Bob Piziak and Dr. Lance Littlejohn (both former chairs of the Math department) to recognize our

many donors. If you are thinking of making a gift to the Department or you simply wish to chat, please do not hesitate to reach out to: Dorina_Mitrea@baylor.edu

... it is clear that [Alumni] support goes to the very core of it all: you are, have been, and will always be splendid allies for the Mathematics Department at Baylor.

Reflecting on all the aforementioned accomplishments, it is clear that your support goes to the very core of it all: you are, have been, and will always be splendid allies for the mathematics department at Baylor. Our discipline, our students, and our university are essential for our state and our nation.

As with past editions of this letter, I wish to leave you with one of my favorite quotes, attributed to Albert Einstein: *"The most beautiful thing we can experience is the mysterious. It is the source of all the art and science."*

Featured Scholarship Recipients 2019

The Department of Mathematics is fortunate enough to be able to offer a variety of scholarships to students who are studying in this field. These Scholarships, made possible by donors, allow students to focus on their academics and pursue higher education without having to worry about finances. Seniors Blake Allen, a Mathematics and Physics Major and Ben Sepanski, a Mathematics major, are two of the 40 undergraduate students who receive scholarships allowing them to pursue their academic careers at Baylor. To hear how these gifts have benefitted them at their time at Baylor follow this link:

<https://youtu.be/-ZzV3S8KNL4>



Screenshot of Ben Sepanski from scholarship video

Professor Profile

It was with some hesitation that I agreed to write a bit about my life as a mathematician since, as so many in our profession, I prefer to work steadily and quietly in the background.

Moreover, I quote from a 2011 interview with the late John Tate, who relished the beauty of mathematics, but keenly understood that this was not something easily shared outside our field, “unfortunately, it’s only beautiful to the initiated, to the people who do it... You don’t have to be a composer to enjoy music, but in mathematics you do.”

Despite the overwhelming odds against the possibility of effectively sharing my fascination with our subject, let alone explain in some detail what it is I do, I’ll try to give at least a hint at what makes mathematicians tick and work around the clock.

In my case it started a bit after the age of 12. I came across an encyclopedia at home that had an



interesting chapter on Isaac Newton’s mechanics which attempted to explain the elements of Calculus to the layman. I was mesmerized by that piece and it was to decidedly influence the rest of my life.

My father (an avid chess player, who realized early on that his son would not likely share his passion for this particular game) pounced

Dr. Gesztesy

on this and purchased a book series on Engineering Mathematics used at the Technical University of Graz, Austria. I devoured those books in the following three years.

In addition to those activities and playing soccer with friends, I taught myself to repair ancient radios and TVs (those employing vacuum tubes, not transistors).

After finishing the Gymnasium in 1972, it seemed most natural to me to study Physics and Mathematics hence I enrolled in Theoretical Physics at the University of Graz.

It only took about 2 years at the Theoretical Physics Department for me to realize that I did not have the genetic makeup for a theoretical physicist and so I soon gravitated toward Mathematical Physics, and after my Ph.D. in Theoretical Physics (1976), drifted more and more into Mathematics proper, eventually joining the Department of Mathematics at the University of Missouri, Columbia, in 1988.

After 28 years at the Univ. of Missouri, I joined Baylor Univ. in 2016, one of the happiest professional moves I ever made. Forty-three years after my Ph.D. I now look back at an output of 3 books, nearly 300 papers coauthored, and 16 Ph.D. students supervised, but numbers very inadequately take the measure of a mathematician.

Well over 100 collaborators, without which this would have been unthinkable, speak to the fundamental importance of human interactions as an integral part of mathematical research (often misinterpreted as a cold and austere art).

The election to the Royal Norwegian Society of Science and Letters, Trondheim, Norway (2002) and becoming a Fellow of the American Mathematical Society (inaugural class, 2013) were very gratifying milestones, but in the end, having had the opportunity to repeatedly publish in the very best mathematics and physics journals is what keeps me going to this day.

These days, I predominantly work in Operator and Spectral Theory, areas that originated in Mathematical Physics and were specifically developed to shore up the mathematical foundations of Quantum

Mechanics, the principal operators of interest being differential operators.

Returning to what makes mathematicians tick, let me offer the following: Out there is an incredibly exciting universe of ideas waiting to be explored with the rigorous arsenal of rules and techniques available to someone with mathematical training, underscored by the bewildering fact that mathematics has become the language of choice for all the hard sciences. Playing a tiny role in such an extraordinary and grand scheme holds a fascination that literally keeps us up at night. What could possibly be better than that?

In case you're interested in knowing what else I like to do in what little time is left beyond working on mathematical problems (now that my time playing soccer is long over), I'll let you in on a little secret: My wife Gloria and I truly enjoy snorkeling and in case you wondered where the picture was taken, it was on Hawaii, the Big Island, with Holei Sea Arch (Volcanoes National Park) in the background.

Fritz Gesztesy
 Ralph and Jean Storm Professor
 of Mathematics

...numbers very inadequately take the measure of a mathematician.

Department of Mathematics Installs Wall of Honor to Recognize Donors

On Aug. 15, 2019, the Department of Mathematics had a Wall of Honor installed on the third floor of the Sid Richardson Building to recognize its many donors. This was a project more than ten years in the making between Baylor's Office of Advancement and the Department of Mathematics.

"Finally, we can recognize our donors for their generous gifts to the Department", says Dr. Robert Piziak, "the Baylor Department of Mathematics has been blessed over the years with many generous donors. We have numerous endowed scholarships to help our students and an endowed Chair to help our faculty. After many years of effort, we finally created a public display as a way that says thank you to these many donors."

Dr. Piziak, a former Chair of the Department, spearheaded efforts to build the Wall of Honor along with Angie Rager (Office of Advancement) and Lance Littlejohn, who stepped down as Chair on July 31 of this year. Littlejohn adds that "We are very grateful to

Angie, Amy Chapa, Davin Denk and David Cortez in Advancement for seeing through to the end this important project."

The Waco-based company D1 Design, co-owned by Dustin Anderson and Jason Smith, designed, constructed, and installed the wall.

Dorina Mitrea, the new Chair of the Department of Mathematics, encourages donors to the math department to stop by to visit with her and to see the Wall of Honor proudly displayed in our department!

- | | | |
|-------------------------------|-----------------------------|--------------------------------|
| Clara B. Perry | Mr. John Scott | Sam and Barbara (Green) Wilson |
| Robert and Veronica K. Piziak | Mr. and Mrs. Mark Shewmaker | Dennis and Donna Winborn |
| John P. and Ellen H. Riola | Mr. and Mrs. Ben Sley | Deborah Wood & Associates |
| Dr. and Mrs. Howard L. Rolf | The Welch Foundation | |
| Dr. and Mrs. James S. Rolf | David and Nancy Hidy Wilson | |
| Mr. Timothy C. Schultz | Jon and Christin Wilson | |

UPDATED JUNE 2019

Homecoming Brings Reunions

Mathematics Department alumni gather to discuss where their careers have taken them since they left

Written by: Elisabeth George

The mathematics department held a homecoming reception on the first floor of Sid Richardson. Alumni and their families gathered after the homecoming parade, October 12, to visit with former professors and classmates, sharing stories and catching up over coffee and pastries.

Marshall Hickman, class of 2017 B.S. in mathematics, said he enjoyed his time at Baylor and his degree helped him develop problem solving skills. Hickman taught high school math for a year at McGregor High School in McGregor, but is now studying independently for the actuarial credentialing exam.



Marshall Hickman

“It was good, it was hard. Definitely given me an appreciation for all that teachers have to do [...] I enjoyed my time doing that,” said Hickman. He also said that he realized that teaching was not what he wanted to do long term.

Brian Pennington, class of 2018 Ph.D. in financial mathematics, moved to Denver, Colorado after graduation and is working in cryptocurrency. He said he had always wanted to work on Wall Street but wasn't sure how to get there, so he went into Baylor's graduate program.

“I definitely want to stay in cryp-



Photo Courtesy of Nick Cabot

Pictured above: Col. Randy Cason attended the Department of Mathematics Homecoming reunion brunch with his family

tocurrency,” said Pennington, “out in Denver, there is such a great work life balance.”

Col. Randy Cason, class of 1995, said his degree in mathematics has been helpful in his career through its training in logical problem solving.

“I was the first air force reservist and the 26th pilot overall to ever fly the F-22 Raptor. And I started flying the F-22 Raptor in 2006, when you're in a brand-new weapons system its problem after problem after problem because you just don't know what you don't know when you're getting into something brand new. So, the skills that I learned from the math department helped me work through the daily problems that arised (sic) in dealing with a brand-new aircraft and brand-new weapons system. We had to learn



Brian Pennington

how to fly it. We had to learn, more importantly, how to employ it. How does America, like how does it help America, what does America need out of this thing? And, those skills have been highly beneficial. And as I've continued to progress more and more towards upper management, it goes from dealing with combat tactical problems to dealing with people problems to more strategic problems, but there's always problems to solve, it never ends.” said Col. Cason.

He now works as a pilot for American Airlines.

Winter 2020 Newsletter

Writers: Elisabeth George, Nick Cabot
Guest Writers: Dr. Mitrea, Dr. Gesztesy
Editors: Elisabeth George, Nick Cabot
Photos: Nick Cabot, Dr. Gesztesy

For more information contact Dr. Mitrea at Dorina_Mitrea@baylor.edu