



DEPARTMENT OF MATHEMATICS AND STATISTICS

IN THIS ISSUE

# Scientific Computation Workshop

by Chunmei Wang

The workshop "Scientific Computing meets Machine Learning and Life Sciences" was held on the campus of Texas Tech University in Lubbock, TX, from October 7 through October 9, 2019. This workshop brought together leading experts and early career researchers from mathematics, statistics, computer science, machine learning, data sciences, and life sciences to report on cutting-edge and state-of-the-art computational algorithms in scientific computing and to identify computational and statistical challenges and open problems in machine learning and the life sciences. In addition, the workshop provided a forum for an international and diverse group of researchers to foster communication, to facilitate new

collaborative interactions, and to initiate joint research projects that will address the open and emerging issues and the computational and statistical challenges posed in machine learning and the life sciences. The opening remarks of the workshop were given by the Vice President for Research and Innovation Dr. Joseph Heppert.

## "Scientific Computing meets Machine Learning & Life Sciences"

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FACULTY SPOTLIGHT

Congratulations to Dr. Reagan Higgins who was recently named an Integrated Scholar by the Office of the Provost & recognized with a Research Spotlight by the Texas Tech Women Faculty Initiative



2019 PUBLICATIONS

The Department published a total of **124** publications in 2019





## Chair's Corner

by Magdalena Toda

The Department of Mathematics and Statistics at Texas Tech University is one of the largest departments on campus, with 44 tenured and tenure track faculty, 9 postdocs, 10 instructors, and approximately 150 graduate students.

Five new faculty hires were added in Fall 2019: four as assistant professors on tenure track (Dr. Tao Lu, Dr. Stamatis Pouliaxis, Dr. Hung Tran, Dr. Kazuo Yamazaki). We also hired three new post-doctoral teaching scholars, namely, Dr. Daniel Grady, Dr. Iason Efraimidis, and Dr. Toufik Khyat.

The department was placed in the Math Public Medium Group in 2011 by the American Mathematical Society (AMS), based on its annual average count of Ph.D. degrees granted between 2000-2010 (under 6.8). According to the AMS Surveys, in 2021 we could be included in the top doctoral degree granting group (Math Public Large). Over the past decade, our annual average of doctoral degrees conferred exceeded 10. We look forward to this reclassification.

The department carries the largest teaching load of any single department at Texas Tech, with an annual average of over 83,000 SCH between 2017-2020. Enrollment in mathematics and statistics courses continues to rise.

Over the past 3 years, there has been a significant increase in the number of publications jointly produced by faculty, postdocs, and students, which is strongly related to the active collaboration between these categories. The department has an excellent productivity record (above 2.5 refereed publications per faculty member per year, for the past 3 calendar years). The amount of funding which entered the ORS budget exclusive contributions of our faculty as PI or CO-PI between 03/2017-03/2020 is around \$2,800,000. Interestingly, in terms of total amount of awards granted in the past 3 years, about 60% was secured by underrepresented categories in the mathematical fields (namely, women and ethnic minorities, which represent only about 22% of the department's Graduate Faculty).

The department makes a concerted effort to maintain strong ties with alumni and friends. These efforts have been rewarded by a significant growth in departmental endowments in recent years. At the undergraduate level, more than 50 scholarships have been issued this academic year by the department. At the graduate level, the department granted over 30 graduate scholarships and fellowships, and 12 others were provided by the Graduate School in Spring 2020.

Since mid-March 2020, the department's instructors of record worked extremely hard to create new materials for online classes. While the COVID-19 pandemic affected all of us morally and emotionally, we remain hopeful that no department member will get infected with the virus that produces this disease (SARS-CoV-2).

I would like to thank all the 160 instructors of record (faculty, postdocs, lecturers, and graduate part time instructors) for their concerted efforts to keep up our excellent standards in teaching and research. I would also like to acknowledge our new unit manager, hired in 2019, Mrs. Betty Ann Thomas. Under her supervision, all the staff members have excelled in their duties, and deserve special recognition, and in particular Mrs. Kim Loveless and Mrs.

Janaki Sugathadasa. A special thank you goes to our undergraduate advisors and lecturers Mrs. Patricia Schovanec and Mr. Yancy Nuñez, our associate chairs Dr. George Brock Williams and Dr. Xiaochang (Alex) Wang, as well as our graduate manager Mr. David Cannon, for their many efforts and dedication. Our recently promoted IT Senior Specialists Mr. Michael Kacal and Mr. Collin Smith have been fundamental in our transition to teaching all-online courses this Spring. We would not have made it without their help, and we owe them gratitude. Last but not least, I would like to thank Dr. Angela Peace for her hard work and enthusiasm in putting together the current newsletter. Wishing everyone excellent health and success,

Magdalena Toda, Ph.D.

Professor and Department Chair

Department of Mathematics and Statistics  
College of Arts and Sciences, Texas Tech University

**“I would like to thank all the 160 instructors of record for their concerted efforts to keep up our excellent standards in teaching and research.”**

## Scientific Workshop

Continued from Cover page

mathematics & Statistics supported the attendance of 18 past-PhD researchers who presented talks and 20 graduate students who presented posters. More information on the workshop is available at <http://www.math.ttu.edu/scmls2019/>.

The workshop consisted of 4 plenary talks, 14 invited talks, a poster session (40 posters), a panel discussion section, a tutorial section and group discussions which stimulated an intensive exchange of ideas and foster fruitful interactions. This workshop which was financially supported by NSF and the department of Mathe-

# Welcoming New Colleagues



**Dr. Stamatis Pouliasis**

Assistant Professor

His research in potential theory and complex analysis Capacities includes potentials, harmonic and sub-harmonic functions, condensers and geometric function theory



**Dr. Hung Tran**

Assistant Professor

His research focus includes Geometric Analysis, Minimal Surfaces, Einstein Manifolds, and Spectral Theory

**Dr. Kazuo Yamazaki**

Assistant Professor

His research focus includes analysis of PDEs in fluid mechanics and biology via functional, harmonic and stochastic analysis tools



**Dr. Tai (Tom) Lu**

Associate Professor

His research focus includes Statistical Bayesian methodology and parametric and nonparametric mixed effects models



**Dr. Bhagya Athukorallage**

Instructor

His research focus includes Calculus of Variations, Differential Geometry, Capillary surfaces, Protein folding, and Contact angle hysteresis



**Dr. Anthony Gruber**

Assistant Professor of Practice, Costa Rica

His research is in differential geometry with focus working on surface theory and its applications to biology, physics, and data science

# Our Newest Postdocs



**Dr. Toufik Khyat**

His research focus includes Difference Equations, Differential Equations, Bifurcation theory, Dynamical Systems



**Dr. Iason Efraimidis**

His research focus includes Complex Analysis, Geometric Function Theory



**Dr. Daniel Grady**

His research focus includes Geometry, Topology, and applications to physics

# SIAM News

By Geethanjalee Mudunkotuwa

The TTU SIAM is a graduate student organization affiliated to Mathematics and Statistics Department of Texas

Tech University and it is one of the student chapters of the Society of Industrial and Applied Mathematics (SIAM). The primary focus of this chapter is to promote all areas of mathematics to young mathematicians and scientists around the world.

SIAM provides a forum for students and faculty to exchange ideas and research outside of the classroom and gives an opportunity for its members to develop networks, build leadership skills, and learn about career options. Therefore, we organize numerous academic events like Colloquia, Symposia, and Career Talks to stay in touch with the latest research trends.

In 2019/2020 academic year so far, we organized many academic events including 2 colloquia and Graduate Students' Research Day (GSRD). The GSRD is a two-day research competition that provides graduate students from the Department of Mathematics & Statistics at TTU the opportunity to present results of their ongoing research to their peers and faculty members. During this event, graduate students presented their works to a committee composed of three faculty members from statistics, pure mathematics and applied mathematics disciplines.

The latest colloquium was on Anderson Acceleration to Improve Nonlinear System Solving by Dr. Leo G. Rebholz, who is a Professor of the Department of

Mathematical and Statistical Sciences and current Division Leader of Mathematics at Clemson University.

Every year, SIAM TTU Chapter awards scholarships worth thousands of dollars, for active SIAM members with outstanding academic performances, to encourage them to engage in more research in Mathematics and Statistics.

We were in the process of organizing West Texas Applied Math Graduate Mini Symposium 2020 which was scheduled to be held during the month of April and was unfortunately cancelled due to COVID -19.

The travel funds which we provided through the years has helped many graduate student members attend conferences all over the country, alleviating the burden of registration fees and expensive airfares. Only last year, TTU SIAM awarded thousands of dollars for travel reimbursement and this year we expect to be giving no less than last year's amount.

TTU SIAM is also a good promoter of social events to improve social interaction among its members and faculty. Every fall, we organize a Thanksgiving Luncheon for the department, while in the spring we organize picnic along with a barbecue event. Many other events are usually organized, such as movie nights and bowling socials.

In conclusion, anyone who is interested in becoming involved with TTU SIAM is very welcome to contact any officer to gather information on membership application and upcoming events.



# AWM Raiders Student Chapter

By Nadeesha Jayaweera

The Raiders Chapter of the Association for Women in Mathematics at TTU is both an undergraduate and a graduate student organization affiliated with international AWM organization as a local student chapter, whose goal is to encourage women and girls to study and to have active careers in the mathematical sciences, and to promote equal opportunity and the equal treatment of women and girls in the mathematical sciences.

As a new registered student organization, we are planning to share more research-based activities among the members by organizing colloquiums and other academic activities. Travel funding will be given to both undergraduate and graduate students as an encouragement to attend conferences to improve their research-based knowledge and also to connect with the

world by reducing their travel expenses. Also, awarding scholarships is a great opportunity to reduce their burden of tuition fees and other expenses as a student. From this year, we are planning to give scholarships for both undergrad and graduates.

We organized an informal discussion with a panel of successful woman in Mathematics from the Department of Mathematics and Statistics at TTU to encourage members in the field of Mathematics and we are going to organize AWM colloquiums, poster competitions for graduates and an essay competition for high school students in this year. On the other hand, many social activities such as potluck luncheons, ice-cream socials, picnics and other social activities are organized



throughout the year to improve the social interaction among the members. The AWM Raiders faculty advisor and the co-advisor continue to be Dr. Angela Peace and Dr. Raegan Higgins respectively.

Finally, anyone who is not yet joined with AWM Raiders is very warmly welcome to contact any officer to gather information on membership and any other upcoming events hosted by AWM Raiders.

# Fostering Community for Young Mathematicians

By Angela Peace

come mathematics educators and researchers, or who simply love and use mathematics in their studies, work and daily activities. With topics ranging from Algebra and Combinatorics to Geometry and Number Theory these weekly activities expose middle and high school students to exciting mathematics. In addition to pizza, participating students get extracurricular opportunities to extend mathematical knowledge and skill well beyond local schools' curriculum. Texas Tech Math Circle creates a



Throughout the Fall and Spring of 2019, TTU Math Circle provided weekly lectures on Thursday nights to local K-12 students.

Its mission is to increase the quality and quantity of students who be-

## “Texas Tech Math Circle

**creates a math fostering and friendly atmosphere for K-12 students”**

math fostering and friendly atmosphere for K-12 students. Activities are organized by Dr. Jeffrey M. Lee, Dr. Cezar Lupu, and Dr. Hung Tran with guest lecturers including Dr. Dmitri Volchenkov, Dr. Daniel Grady, Dr. Razvan Gelca, Dr. Dmitri Pavlov, Dr. Kazuo Yamazaki, Dr. Iason Efraimidis, and Dr. Toufik Khyat. For More information visit <https://lupucezar.wordpress.com/ttu-math-circle/>.

The department has been an institutional chapter of the MAA (Mathematical Association of America) since 2018 and our student members can take advantage of the benefits offered by the MAA. This chapter continues to provide encouragement in the mathematical sciences as well as social activities for our undergraduate math majors and minors. The Undergraduate Math Club also remains active providing financial and social support for our undergraduate math majors and minors. Giorgio Bornia continues as the Math Club faculty advisor.



**“Online talks will be presented from a diverse group of international speakers, many of whom are early career researchers”**

## Texas Geometry and Topology Conference to be held April 2020

virtually on April 24-26, 2020. Due to the Covid-19 pandemic the conference will be held via selected teleconferenced speakers. Online talks will be presented from a diverse group of international speakers, many of whom are early career researchers. This meeting is supported by Texas A&M University via a National Science Foundation Award (DMS-1812040), as well as Texas Tech University. Graduate students, junior faculty, women, individuals from under-represented groups in the mathematical sciences, and persons with disabilities are especially encouraged to participate. Local organizers include Dr. Magdalena Toda, Dr. Razvan Gelca, Dr. Alastair Hamilton, Dr. Jeffrey Lee, Dr. Dmitri Pavlov, Dr. Hung Tran, and Mrs. Betty Ann Thomas. For more information see <http://www.math.ttu.edu/conferences/tgtc/2020/index.html>.

The Department of Mathematics and Statistics is excited to host the 63<sup>rd</sup> meeting of the Texas Geometry and Topology Conference, which will take place

# Graduate Degree Recipients

## May 2019

- MS Math** Atampalage, Madusha Dilhani C  
Balasuriya, Balasuriya Mudiyanseleage  
Cai, Yang  
Corbin, Desi  
Dassanayaka Mudiyanseleage, Sachith Eranga  
Pena, Stephen M.  
Perkins, Aaron R.
- MA Math** Tripathi, Vedant
- MS Stat** Herath Mudiyanseleage, Ruwani Rasanjali  
Imiya Mohottige, Lakmini Nadeesha Jayaweera  
Jayasinghe, Jayasinghe Mudiyanseleage  
Kesawan, Ramesh Aravind  
Mahanama, Thilini V.  
Mi, Nan  
Teng, Ying

## December 2019

- PhD Math** Pathmanathan, Sureka  
Samarasiri, HendaHewa Supem Ranjana
- MS Math** Gunasingha, Keeragala Arachchillaya  
Harris, Rachel M.  
Karr, Randall  
Long, Cole P.  
Mikes, Colton R.  
Mills, Casey J.  
Ramirez, Ramiro  
Sanders, Brooke C.  
Smirnov, Veniamin L.
- MS Stat** Aavani, Pooya  
Dassanayake, Isuru Dilan  
Ma, Zhuanzhuan  
Norouzi Darabad, Masoud

## August 2019

- PhD Math** Gruber, Anthony D.  
Guo, Mengmeng  
Hassan, MD Nazmul  
Nandi, Aadrita  
Perera, Alahendra Acharige Chamila D.  
Ratnavale, Saikanth
- MA Math** Renfroe, Victoria A.
- MS Stat** Pham, Huy P.



## Math&Stats notes

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The success of the Department is largely possible due to the generous support of many donors. *Thank you!* For more information about giving to Mathematics and Statistics visit <http://www.math.ttu.edu/Other/giving.shtml>.

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