

### DEPARTMENT OF MATHEMATICS AND STATISTICS **Professing Excellence Awards**

by Angela Peace

Multiple faculty members in the department of Mathematics and Statistics were awarded the 2024 Professing Excellence

Award. Professing Excellence is a formal ceremony in which Texas Tech University students are given the opportunity to nominate faculty members and present awards to those who have demonstrated exceptional educational skills. The awards are given to outstanding faculty who success. A total of ten faculty members across campus received this recognition in 2024, four of whom are members of our department. Congratulations are in order for lecturer Jennifer Wang, lecturer Georgia Thompson, GPTI Clayton Paget, and GPTI and interim director of the math

tutoring and studying center Abufor recently receiving the prestigious Professing Excellence award. Thank you for your commitment to and ongo-



bakarr Yillah our students ing dedication to educating

and mentoring the next generation of mathematicians!

#### HIGHLIGHTS IN THIS ISSUE

Hosting the 67<sup>th</sup> TGTC Page 2 Texas Geometry and Topology Conference

Undergrad research in AI Page 3 Cutting edge research at the interface of math & AI

#### Student News Pages 4,5 Updates from student SIAM and AWM chapters.

#### SPOTLIGHTS

Congratulations to doctoral student Bradley Vigil, a recipient of the prestigious 2024 Charles S. Peirce Interdisciplinary Graduate Fellowships from the Institute for Studies in Pragmaticism





Congratulations to Dr. Raegan Higgins, newly elected president of the Association for Women in Mathematics, a nonprofit organization serving our international mathematics community!

go above and beyond, both inside and outside the classroom, to impact their students' learning and academic



# Chair's Corner

#### by Magdalena Toda

Our department is one of the largest departments on campus. It currently includes a total of 44 tenured and tenure track faculty, 3 postdoctoral teaching scholars, 15 lecturers and instructors, and 140 supported and unsupported graduate students whose primary or secondary degrees are under completion in our department. This Spring of 2024, 3 additional tenureline faculty and 4 postdocs were re-

cruited and hired for the next academic year.

The department is strongly committed to excellence in teaching, research, and service, and is well recognized for its outreach efforts through multiple initiatives, including but not limited to STEM scholarships and recruitment, TexPREP Lubbock annual summer program; Emmy Noether High School Mathematics days; and active engagement in the Student Chapters of SIAM (Society for Industrial and Applied Mathematics), AWM (Association for Women in Mathematics); MAA (Mathematical Association of America) and Tech Actuarial Society.

This Spring, Dr. Leif Ellingson was granted promotion to full professor, and Dr. Dmitri Pavlov was granted tenure and promotion to associate professor towards the next academic year. Over the past six calendar years, our faculty has contributed as PI, co-PI, and senior personnel to securing and managing TTU grant awards spanning multiple colleges and departments, totaling over \$20M. Since Jan 2018, the individual shares of our faculty investigators have totaled \$5,893,550, according to the TTU ORS reports.

In 2024, Edurank listed our department as the 70th among the top 100 universities in the US for Applied Mathematics. College Factual lists our department as #69 on the list of Best Value Colleges for Mathematics, #69 in terms of Best Mathematics Doctoral Degree Schools, and #4 in the Best Value Doctoral Degree Colleges for Mathematics in the US.

We offer two different Bachelor's degrees of 120 hrs, a dual degree in Mathematics and Computer Science (162 hrs), two Master's degrees (in Mathematics and Statistics), and five different tracks of doctoral studies: applied mathematics, pure mathematics, statistics, mathematical finance, and mathematics education. Together with the Department of Economics, we are currently working on developing a dual Bachelor's degree program in Economics and Mathematics. We currently teach over 80,000 standard credit hours and take pride in our students' success, career placement, excellent retention, and time to graduation.

We are grateful to the many *donors and friends* of the department who have provided large amounts of funding to support our students in their studies. We appreciate you all for your generosity and support! As a donor myself, and an administrator, I experience the blessing and emotion of sponsorship both ways!

We appreciate every departmental member for their contributions, and we are proud of our diversity, equity, and making everyone feel included, respected, and valued!

## Texas Geometry and Topology Conference

#### By Hung Tran

Our department hosted the 67th meeting of the Texas Geometry and Topology Conference from April 19th to 21st, 2024. The conference is dedicated to the enhancement of both the educational and the research atmosphere of the community of geometers and topologists in Texas and surrounding states. Specifically, it served as a platform for the widespread sharing of recent developments in geometry along with open questions and challenges. The workshop-style event, with strong emphasis on fostering communication and interaction, provided ample opportunities for participants to find access points. Expectedly, the interactions and discussions will establish a springboard for further advancement in the field.

The conference featured plenary speakers of international stature, 48 registered participants, and several local attendees. The participants' backgrounds vary in career stages (from early career to senior professors), gender, and race (Hispanics, Asians, and Caucasians). The accompa-

"a platform for the widespread sharing of recent developments in geometry along with open questions and challenges."

spanics, Asians, and Caucasians). The accompanying social activities, including a picnic at
Mae Simmons Park, were a great platform

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for informal discussion, mutual scholarly understanding, experience sharing, and networking opportunities. Thus, it contributed toward the formulation of a scientific community with a strong sense of camaraderie.

The conference was complemented by Graduate Colloquium & Geometric Analysis Lecture delivered by Professor Igor Zelenko from Texas A&M University. The talk was accessible to graduate students and researchers at the beginning stage. Finally, the success of the event is thanks to the tremendous support of our department faculty and staff. Special mention goes to Rosa Testini and Joseluis Sanchez who took care of all logistic matters and beyond (including being there to support on a Saturday morning during a rainstorm).

### Welcoming New Colleagues



Joseluis Sanchez Associate Director



**Erandy Garcia** Administrative Business Assistant



Hanh Doan Math Tutoring Center Director

# Undergraduate Research on the Interface of Math and AI

By Lourdes Juan

The students in the Laboratory of Probabilistic Methods in Artificial Intelligence are developing an expert system to assist in the care of cancer patients. The system uses AI machinery to model a multidisciplinary team of specialists in the evaluation and treatment of lung cancer. The system has three main components, one of which is the mathematical core that processes the data and creates an inference engine based on Bayesian Belief Networks, a probabilistic graphical method used to model causal relations under uncertainty. Another component models the experts' knowledge through a cancer ontology and semantic webs with the input of medical experts. The third component deals with the preparation of the database to render it usable by the other components.

We use as our guiding model the Lung Cancer Assistant developed at the University of Oxford and The Royal College of Physicians of

London, with the UK lung cancer database. The students in our lab are developing these components to make them work with the USA National Cancer Institute SEER database. Once we develop the main mathematical core, the system will be available for further research opportunities including the addition of more mathematical and machine learning tools sensitive to specific applications (not necessarily cancer or medicine related). So, the expectation is that this project will continuously evolve and provide opportunities for new research, interdisciplinary collaborations and community engagement.

The undergraduate students working on the project are Madeline Brandt (Mechanical Engineering), Gabriel Koeller (Computer Sciences, completed BS degree in Spring, 2024), Hayden Gilbert (Civil Engineering), Alejandro Gutierrez-Fiol (Computer Sciences) and Joshua Josey (Computer Sciences), all of them Honors students. They have presented their work at the TTU's Transformative Undergraduate Experiences Symposium and Undergraduate Research Conference. New members starting this summer are Matthew Nunez, Luisa Maria Quintero and Shahir Tahiri (all Computer Scciences majors) and Stella Solaas (Mathematics).

To ensure the continuity of the project, we offer a course on Mathematical Methods in AI to prepare and recruit new students as others graduate. The lab also includes three graduate students, one of which completed his Masters this Spring.

The undergraduate students are supported by the TTU undergraduate research programs TrUE Scholars, Honors College's Undergraduate Research Scholars and the Center for the Integration of STEM Education and Research Scholars.



Undergraduate student researchers presenting at the the TTU's Transformative Undergraduate Experiences Symposium and Undergraduate Research Conference.

# Society for Industrial and Applied Mathematics (SIAM) **TTU Student Chapter**

#### By President Boluwatife Awoyemi

We are excited to share updates from our dynamic student organiza- although we did not hold a bowling event, we continued our tradition tion at Texas Tech University's Mathematics and Statistics department. We are dedicated to enriching graduate student life and promoting applied and computational mathematics worldwide.

Academic Colloquia and Monthly Meetings: We're dedicated to nurturing interdisciplinary connections among students and faculty, fostering networking, idea sharing, and career development. Through regular academic events like colloquiums, symposiums, and career talks, participants stay informed on research trends, connect with scholars, and hone leadership skills. In October 2023, we hosted Dr. Tiziana Giorgi, Department Chair of Mathematics at the University of Alabama and a renowned expert in pure and applied PDEs, for a colloquium in collaboration with our department, enriching at-

#### SIAM OFFICERS



Vice President Md Mahmudul Bari Hridov



Treasurer Rifat Rejuan



President Boluwatife Awoyemi



Secretary Abubakarr Yillah



Event Coordiator Jagdish Gnawali

tendees with insights and networking opportunities. In April 2024, our Graduate Student Research Day (GSRD) allowed graduate students to showcase their research to peers and faculty. Monthly chapter meetings furthered networking and updates beyond the classroom.

#### **Team-Building**

Activities: Each year, we host a variety of engaging events, including bowling outings, a fall Thanksgiving luncheon, and an eagerly anticipated

spring picnic, all open to our entire department. These occasions provide not only opportunities for friendly competition and delicious meals but also the chance to cultivate meaningful connections. This year,

with the Thanksgiving Luncheon and the spring picnic. TTU SIAM prioritizes social interaction, fostering camaraderie among members and faculty.

Travel Funds and Scholarships: Several graduate students received funding for conference travel, thanks to the generous support provided by Professor Jay Conover this year. These opportuni-



### Society for Industrial and **Applied Mathematics**

ties allowed students to expand their academic perspectives and establish connections with fellow scholars and industry professionals. Additionally, we celebrated the

achievements of eight scholarship recipients: two students received the GSRD award, three were awarded SIAM scholarships based on their outstanding academic performance, and two students were recognized for their exceptional teaching skills with the teaching award. We extend our gratitude to all those who contributed to the success of these initiatives, empowering our students to excel both academically and professionally.

Get Involved: We extend a warm invitation to anyone interested in becoming involved with TTU SIAM to reach out to any of our officers for details regarding membership applications and upcoming events. Your participation is highly valued, and we look forward to welcoming you into our community.



Faculty, students, and staff enjoying SIAM's annual picnic.

## Engaging the Community at Emmy Noether Day

**By** Angela Peace

On May 9<sup>th</sup> we hosted the 21<sup>st</sup> Emmy Noether Day, an annual tradition hosted by our department since 2003 that provides a supportive environment for girls from local middle and high schools to engage with mathematics. This year over a hundred girls from 6<sup>th</sup> to 12<sup>th</sup> grade participated. The event was organized by Dr. Amanda Laubmeier along with more than 50 graduate students, faculty, and staff volunteers. Event



Career Panel at the 21<sup>st</sup> Annual Emmy Noether day

activities included fun mathematical workshops, a collaborative problem-solving session, career-panel, and lunch. Students choose from a variety of workshops; Math is music. Sounds good? led by Dr. Giorgio Bornia, A Garden Variety Problem - And Its Impact on Bees and Plant Yields led by MS student Morgan Beetler, Parallel lines never meet, or do they? led by Dr. Lars Christensen, Next Up! led by Dr. Raegan Higgins, Conic sections led by Dr. Arne Ledet, Describing the Human Brain led by Dr. Travis Thompson, and Order from Chaos led by Jennifer Wang. Following these workshops, students participated in a collaborative problem-solving competition led by Dr. Angela Peace. The theme for this year's competition was probability and combinatorics. After lunch, students attended a career panel discussion where women in STEM spoke about their experiences, moderated by Ms. Isabell Martinez-Server, a local math teacher. Career Panelists included Dr. Karin Ardon-Dryer, Dr. Catherine Wakeman, and Dr. Dana Weiser. For more information visit the website. https://www.math.ttu.edu/enoether/index.html.

AWM OFFICERS

h AWM graduate students

President

Radhika Rao

Treasurer

### Association for Women in Mathematics

The TTU chapter of the Association for Women in Mathematics (AWM Raiders) hosted a variety of events throughout the year to engage the community inside our department and throughout the campus. Throughout November they hosted a series called "Meet the Professors". Professors from our department were invited to share their research for a maximum of 7-10 minutes. These virtual events provided an opportunity for current and prospective students to know more about the ongoing research in the department from the professors themselves. The AWM also hosted the first ever departmental waffle bar to



AWM members serving at TTU family STEM night.

celebrate the new year and welcome winter. AWM officers made fresh waffles for faculty, students, and staff of our department. They also participated in the TTU family STEM night, an event for K-12 students and their families. This offered an opportunity for the community to engage in hands-on STEM exploration and to



Winter Waffle bar, December 2024.

Vice President Mohammadi Ain



Secretary

Nusrat Tabassum

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### **Tenure and Promotion**

Congratulations to our newly promoted friends & colleagues!



Leif Ellingson Promotion to Full Professor to begin Sept. 2024



**Dmitri Pavlov** Promoted to Associate professor to begin Sept. 2024



Rosa Testini Promoted to Department Unit Manager

Mathematics & Statistics Graduate Student

ster Exhibit



**Bingxin Qi** Promoted for continuing appointment as Lecturer.



Georgia Thompson Promoted to Lecturer

# Graduate Student Poster Exhibition

By Angela Peace

The department hosted a poster exhibition in November for graduate students in Mathematics and Statistics to showcase their research locally within the department. This gave our students the opportunity to gain experience creating and presenting posters. Many of the presenting participants went on to present the same posters at national conferences throughout the Fall and Spring semesters. First and second years students had the opportunity to learn

about the research of their upper classmates and peers. Thank you to Horn professor Dr. Jay Conover for his generous support that helped make this event a success.

















### **Graduate Degree Recipients**

#### May 2023

- Ph.D. Michael Clines Alexis Hardesty
- M.S. Math Eileen Barry Orin Gotchey Jerod Jones Caroline Mahavier Bridget Mann Nicholas Taylor
- M.S. Stat Emilio Verdooren

#### August 2023

- Ph.D. Yawei Cheng Dulanjalee Devage Dona Chathuri Sandamali Isanka Garli Hevage Shadi Heenatigala Md Sakhawat Hossain Rhanuma Islam Chathuri Perera Sithma Jayawardena Mohammad Mahabubur Rahman Kusal Rathnayake Hongbin Weng
- M.S. Math Boluwatife Awoyemi Rachel Fleenor
- Ph.D. Stat Dip Das

#### December 2023

- M.S. Math Mohammadi Ain Sunday Esebre Rifat Rejuan
- M.S. Stat Syed Ehsan Ar Rafi Kushan Munasinghe Sajith Priyankara Naveen Senthil





# Department of Mathematics & Statistics<sup>--</sup>

# Math&Stats notes

Mathematics and Statistics Broadway and Boston Lubbock, TX 79409-1042 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.

*Math&Stats notes* is a publication of the Department of Mathematics and Statistics, Texas Tech University. It is published for alumni, faculty, students, and other friends of the department. Email <u>math.newsletter@ttu.edu</u> to contact the newsletter with questions or to submit information for a future issue.