Math&Stats Notes

DEPARTMENT OF MATHEMATICS AND STATISTICS

XVIII Red Raider Minisymposium

by Angela Peace

The departments of Mathematics and Statistics and Biology hosted the XVIII Red Raider Minisymposium: Modeling in a Heterogeneous World on August 20-21st 2021. This was an international and hybrid meeting with 103 registered participants, 3 plenary speakers, 4 early-career speakers, and over 30 poster presentations. The participants' universities and institutes represented 16 USA states and 7 countries (USA, Canada, China, Australia, France, Nigeria, and South Africa). Distinguished speakers included Mark Lewis, Alun Loyd, Spencer Hall, and Joel Brown. The Red Raider Minisymposium was a successful international meeting! Thank you to the organizing committee Angela Peace, Wenjing Zhang, Joshua

"Modeling in a Heterogeneous World."

Padgett, Linda Allen, and Kenneth Schmidt. The conference aimed to improve our understanding of the important roles heterogeneity plays in ecology and epidemiology using dynamical systems. It brought together diverse researchers—both mathematical and biological– to discuss new techniques, theoretical results, and applications that are beneficial to current questions. It also advanced engagement of diverse graduate students and early-career mathematicians and biologists in these interdisciplinary fields. The minisymposium was possible through support from both departments, the Horn Professorship of Linda J. S. Allen, as well as NSF-1953696.

About 30 people participated in person, and the rest joined virtually.

HIGHLIGHTS IN THIS ISSUE

FACULTY SPOTLIGHTS

Congratulations to Dr. Magdalena Toda who was honored amongst the Phenomenal Women Nominees of Arts & Sciences, by TTU Division of Diversity, Equity & Inclusion (DDEI) and the Student Intersectional Leadership Council.

Congratulations to Dr. Brent Lindquist and collaborators at Nihon Visual, who were recently honored at the 34th Awards for Excellent New Technology & Products by Small & Medium Enterprises for their software "ExFact Analysis for Porous/Particles."

Chair's Corner

by Magdalena Toda

The Department of Mathematics and Statistics is one the largest on campus, with 40 tenured and tenure track faculty, 7 postdocs, 13 instructors, and 110 supported and unsupported graduate students whose primary or secondary degree is in our department. This January, 7 additional faculty were hired towards Fall 2022.

This year, our faculty have secured (as PI and Co-PI) external grants that amount to over 3.7 million dollars in total. Their success makes me very proud of the department, its newfound ideas, energies, and scholarly achievements. We are anchored in an excellent R1 university, and truly, for us, the sky is the limit!

We offer two different Bachelor's degrees, an accelerated Bachelor's to Master's degree, a dual degree, 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. Based on the data we collected over the past four years, we have conferred an average of 101 Bachelor's degrees, 27 Master's degrees, and 14 Ph.D. degrees per year.

We teach over 81,000 standard credit hours a year, and we strive for excellence in teaching, research, service, and outreach. We are here today thanks to our students, through our students, and for our students! 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!

A new addition to the math department staff this year is Victoria Torno, who is responsible for travel, textbooks, and many other duties. Vic is a wonderful addition to our dedicated staff and has become crucial to our mission.

Despite the pandemic, our graduate enrollment grew by 50% over the past year. In terms of curriculum updates, we welcome the option of a new Mathematics Finance Concentration added to the M.S. in Statistics and M.S. in Mathematics (which was approved in March), along with a new Data Science Concentration to the B.S. program in mathematics which is pending approvals.

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

Magdalena Toda, Ph.D.
Professor and Department Chair
Department of Mathematics and Statistics
College of Arts and Sciences, Texas Tech University

NSF funded Summer REU Program

By Angela Peace

During the summer of 2021 the department virtually hosted an NSF funded eight-week intensive program that actively engaged undergraduate students from institutes across the country in research projects using mathematical, statistical, and computational methods to solve problems in the life sciences. Students in the REU (Research Experience for Undergraduate students) worked under the supervision and guidance of Drs. Linda Allen, Akif Ibragimov, and Chunmei Wang. Projects included Environmental Heterogeneity in Tick-Mouse Models for Lyme Disease, Theory and Application of Einstein paradigm of the non-linear Brownian motion, and Numerical Analysis for Nernst-Planck Models. The main goal of the program is to motivate and inspire the REU participants to continue graduate study in mathematics, statistics or a related field and to pursue academic or other research careers in STEM disciplines. Video presentations and posters are available on the program's website: http://www.math.ttu.edu/Undergraduate/reu2021/.

> **"The REU program will continue this summer led by Dr. Leif Ellingson, with a new cohort of undergraduate students who will come to TTU in person for eight weeks."**

The REU program will continue this summer led by Dr. Leif Ellingson, with a new cohort of undergraduate students who will come to TTU in person for eight weeks. The program will introduce undergraduate students to mathematical, statistical and computational methods that enable them to pursue independent research on current problems in the life sciences. This year's projects include Statistical Learning of Binding Activity Using Structural Characteristics of Protein Binding Sites led by Dr. Leif Ellingson, Demographic and Environmental Variability on Population and Disease Extinction led by Dr. Linda Allen, and Friedrichs Learning led by Dr. Chunmei Wang. More information can be found on the website: https://www.math.ttu.edu/undergraduate/reu2022/.

Welcoming New Colleagues

Dr. Binod Rajbhandari
Post Doc

Research Interests: Data Analysis of continuous gravitational waves from neutron stars
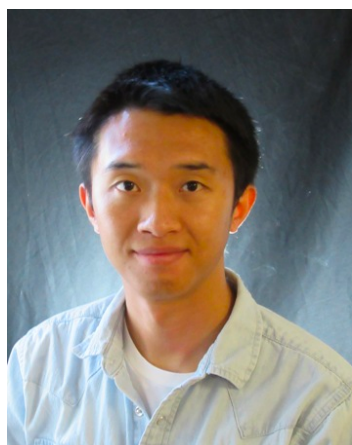
Dr. Andrea Chierici
Post Doc

Research Interests: Applied Mathematics; Computational Mathematics; Computational Fluid Dynamics; Optimal Control

Victoria L. Torno
Senior Business Assistant

She has a Bachelors in University Studies with concentrations in General Business, Human Resource Development, and Organizational Leadership.
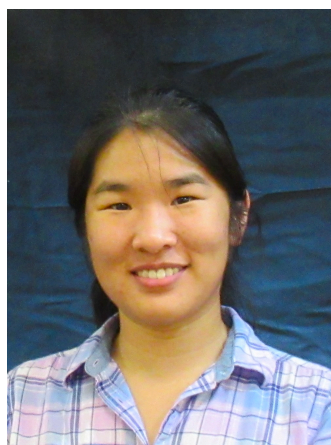
Chuan Liang
Instructor

Dr. Bingxin Qi
Instructor

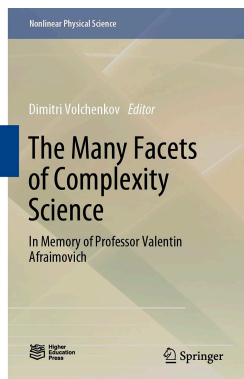### Jennifer Wang
Instructor

Jason R. Bailey
Instructor

Book Announcement: The Many Facets of Complexity Science

By Dr. Dimitri Volchenkov

Dr. Dimitri Volchenkov is editor of *"The Many Facets of Complexity Science"* a Springer book composed of a collection of works devoted to the memory of Professor Valentin Afraimovich. It provides a deep insight into the recent developments in complexity science by introducing new concepts, methods, and applications in nonlinear dynamical systems covering physical problems and mathematical modelling relevant to economics, genetics, engineering vibrations, as well as classic problems in physics, fluid and climate dynamics, and urban dynamics. The book facilitates a better understanding of the mechanisms and phenomena in nonlinear dynamics and develops the corresponding mathematical theory to apply nonlinear design to practical engineering. It can be read by mathematicians, physicists, complex systems scientists, IT specialists, civil engineers, data scientists, and urban planners.

Inspiring Programs in STEM Award: Emmy Noether High School Math Day

By Angela Peace

INSIGHT Into Diversity magazine and website has awarded our Emmy Noether High School Mathematics Day as one of the winners of the 2021 Inspiring Programs in STEM Award. This honor recognizes the effort that colleges, universities, and outside organizations have undertaken to empower underrepresented and women students of all levels to succeed in the science, technology, engineering, and math (STEM) disciplines. More information on their website:

https://www.insightintodiversity.com/the-2021-inspiring-programs-in-stem-awards/

The department first began hosting this mathematical outreach event in 2003 through the efforts of Dr. Mara Neusel and the continued dedication of the department, along with efforts led by Dr. Magdalena Toda, has kept it an important event for the Lubbock community. Last summer the 18th Emmy Noether High School Mathematics Day went virtual and this year the 19th Emmy Noether High School Mathematics Day is back on campus on May 6th, 2022.

Participants have continuously ranked the event's Career Panel as their favorite part of the event, with a recorded evaluation score of 4.8 out of 5 for 10 years in a row. This year's career panel includes Drs. Magdalena Toda, Aliza S. Wong, and Tara Stevens (pictured on left).

AWM Red Raider News

By Vice President Radhika Rao

"Coming together is a beginning, staying together is progress, and working together is success." said Henry Ford. Indeed! The very thought lies at the foundation of the Association for Women in Mathematics (AWM). Since its conception, AWM is tirelessly working towards creating a community that motivates women and other marginalized genders to explore mathematical sciences and make active career choices in the field contributing towards a common good. We, the AWM student Chapter, are immensely proud to be a part of this global organization. Even though we are still at our infancy here at TTU, it is worth noting that we are committed to bringing about positive changes to the way mathematics is perceived in general.

Albeit being restricted to confine our much-planned activities for the past two years, our mathematical spirits are still running high thanks to our mentors, Dr Angela Peace, Dr Lourdes Juan and Dr Amanda Laubmeier. The association is an active participant/organizer for the Emmy Noether day here at the Department of Mathematics and Statistics, TTU. In the previous year AWM has awarded scholarships to its outstanding members. We as an organization strongly believe in social interaction between individuals. Hence, we organize our signature pizza socials often, with a mindset "Food, Fun and thinking Forward". This has provided an equal opportunity irrespective of gender/role for the individuals to voice their opinions and share their ideas. Most of our upcoming events are a direct result of these interactions. For the upcoming academic year, we plan to organize multiple "early career path panel" discussions to expose our fellow students to the spectrum of available career opportunities after a degree in mathematics/statistics. For this event, we hope to involve our invaluable alumni network. We are also looking forward to bringing in various leisure time activities such as a departmental picnic apart from math-oriented seminars and colloquium. Going forward, our goal is to encourage women and other marginalized genders to pursue careers in mathematical sciences by promoting equality in the field. Before signing-off, we would like to remind you that this association is a true TEAM work standing for Together We Achieve More. Hence, your involvement even in a minor capacity can produce wonderful results. So please join us in this effort!

AWM officers: Rahanuma Islam (Treasurer), Radhika Rao (Vice president), Aman Rani (President), Mohammadi Ain (Secretary).

SIAM News

By Vice President Jonathon Loftin

The Texas Tech SIAM Chapter has started to get back in the swing of things this year. Our chapter has always been a place for faculty and students to engage in conversation and activities together, since SIAM is one of the largest graduate student organizations in our department. Members of SIAM have always benefitted academically, as well as socially, from our chapter. With COVID-19 restrictions in place, our chapter was not able to hold final sales for the last two years, which is TTU SIAM's largest source of funding. However, with the enormous generosity of Dr. Jay Conover, the chapter had funds available to host events this year.

The TTU SIAM Chapter kicked things off in the fall with a welcome event to new incoming graduate students in the department. We had a colloquium by Dr. Carrie A Manore – Deputy Group Leader in Los Alamos National Laboratory. She talked about her personal path to becoming a scientist at Los Alamos National Laboratory and offered valuable advice for graduate students. In October we hosted a Halloween costume social. Faculty and students gathered to show off their creativity and enthusiasm for the season. This event provided a platform for the exchange of ideas, as well as a space to decompress.

There was a palpable sense of energy and enthusiasm in the air as our department gathered. The semester was ending, but everyone was looking to the coming year with renewed enthusiasm. Face to face conversations brought new life to the students and the organization.

The spring semester has brought many opportunities for the TTU SIAM chapter to host academic events. Our chapter hosted a colloquium comprised of four 15-minute talks given by assistant professors. This event exposed graduate students to the high level of research being conducted by enthusiastic new faculty. In the words of Collin Smith, our department's IT Support Senior Specialist, "a true menagerie of Mathematical ideas, from Geometry, the energy of condensers, PDEs in Fluid and Mathematical Physics, to ecological population modelling -- something for everyone."

The next event hosted by our chapter was the Graduate Student Research Day. The event consisted of eight graduate students showcasing their research with 15-minute talks. Students gave their presentations to an audience of faculty members, students, and a panel of judges. This year's judges were Dr. Giorgio Bornia, Dr. Jay Conover, and Dr. Kazuo Yamazaki.

The last planned event will occur at the end of the semester with a picnic. SIAM will host a catered BBQ social at Wagner Park, with games for everyone. This event is the perfect opportunity for everyone to decompress after the semester. The TTU SIAM chapter hopes to see everyone there and wants to wish everyone a safe and enjoyable summer.

Society for Industrial and Applied Mathematics

SIAM OFFICERS

Himali Seneviratne
President

Jonathon Loftin
Vice-President

Himali Don
Gammanpila
Treasurer

Shadi Heenatigala
Secretary

Aman Rani
Event Coordinator

Dayawansa Memorial Lecture Series

By Angela Peace

The Dayawansa Memorial Lecture Series tradition continued in April 2022 with guest speaker Dr. Karl Henrik Johansson, the Director of Digital Futures and Professor of Electrical Engineering and Computer Science at the KTH Royal Institute of Technology Stockholm, Sweden. He is a fellow of IEEE, the world's largest technical professional organization dedicated to advancing technology for the benefit of humanity, as well as a fellow of the Royal Swedish Academy of Engineering Sciences. This lecture series is generously sponsored by Dick and Martha Brooks Endowed Professor, Dr. Bijoy Ghosh. Johansson delivered interesting lectures on Cybersecurity and Privacy in Networked Control System, Traffic Control using Automated Vehicles: Distributed Sensing, Actuation and Learning, and Control Synthesis Based on Temporal Logic Trees with Application to Shared Autonomy.

Graduate Degree Recipients

May 2021

Ph.D.   Mai Dao
Thilini Mahanama
Dylan Rudy

M.S. Math   Mihrab Chowdhury
Himali Gammanpila
Kyle Greywall
Alexis Hardesty
Ibrahim Lawal
Chuan Liang
Ali Samadian

M.S. Stat   Md Sakhawat Hossain
Sangam Pangeni
Charu Rajapaksha
Jennifer Wang

August 2021

Ph.D.   Madusha Atampalage
Malima Atapattu
Isuru Dassanayake
Rachel Harris
Basitha Hewa Wellalage
Erdi Kara
Nilan Kasisetti Mudalige
Md Masud Rana
Abootaleb Shirvani
Dong Xu

M.S. Math   Farjana Mukta
Dalton Pruitt

M.S. Stat   Yawei Cheng
Geethanjalee Mudunkotuwa

December 2021

Ph.D.   Casey Mills
Ramiro Ramirez
Veniamin Smirnov

M.S. Math   Jason Bailey
Justin Gonzalez

M.S. Stat   Cole Long
Hong-bin Weng

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Department *of* Mathematics & Statistics™

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.

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 math.newsletter@ttu.edu to contact the newsletter with questions or to submit information for a future issue