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A green light to greatness.

{ Math News }

A publication of the Department of Mathematics at the University of North Texas

Chair's Column

Su Gao

Dear members and friends of the UNT Math Department,

It is my great pleasure to present to you another issue of Math News, the UNT math department newsletter. Thanks to the effort of the department Outreach Committee, we have this precious opportunity to reflect on and celebrate the wonderful achievements of our students, faculty, and staff.

As department chair, I think I was aware of all the events presented in this newsletter as they took place during the last year. And yet, when they are in front of me in this collective form, I still feel like I am totally blown away.

The superstars here are our students. From the Math Club to the RTG SUMS program, from the Problem of the Month Competitions to the Integration Bee, from the Mathematical Contest in Modeling to the Putnam Exam, our undergraduate students engage in a dazzling number of activities. I lost count of the names of undergraduate students mentioned in this newsletter. Maybe you can help me.

Our students also demonstrate their resolute commitment to excellence and professionalism in research. There is so much emphasis on this word nowadays that I believe it deserves to be spelled in capitals: RESEARCH. From Cantor series expansions to Borel chromatic numbers, from polynomial-time relation reducibility to bioinformatics approaches to fighting influenza, our undergraduate and graduate students accomplish first-rate research results. Our graduate students organize their own seminars and research conferences – they already hold the key to building future research communities.

For our faculty as devoted educators, there is nothing more gratifying than to see our students being wildly successful.

I invite you to read on and explore the details of our student success stories (as well as those of faculty and staff). These stories give so much meaning to our brand name: UNT Math

Su Gao
Professor and Chair

Faculty Mentors Undergraduate Researcher

Our RTG postdoc Dr. William Mance and former TAMS student Dylan Airey have been conducting research for the last two years, and they have written six research papers to date. Their recent paper "Unexpected distribution phenomenon resulting from Cantor series expansions" will appear in the high-quality journal Advances in Mathematics. In that paper, Bill and Dylan prove a powerful theorem with applications to problems involving normal numbers, fractal geometry, recursion theory, and the theory of uniform distribution modulo one. Their result can be interpreted as generalizing several known results, but it also establishes new results.

Dylan Airey graduated from TAMS in 2013, and he is now a second-year undergraduate student at the University of Texas at Austin. His research interests are in dynamics and its connections to algebra and number theory.

Bill Mance is a third year postdoc at the University of North Texas. He received his bachelor's degree at Carnegie Mellon University and studied for his doctorate at The Ohio State University under Vitaly Bergelson. In his free time, Bill trains and competes in powerlifting and strongman.

DEPARTMENT OF MATHEMATICS
College of Arts & Sciences

UNT

{ Table of Contents

{ Faculty News

New Postdoc Welcomed

Dr. Elizabeth Drellich joined the department as a postdoc in Spring 2015. Dr. Drellich earned her PhD in mathematics in February 2015 from the University of Massachusetts, Amherst where she studied equivariant Schubert Calculus. While in Western Massachusetts, she worked with the Center for Women in Mathematics at Smith college to mentor undergraduate and post-baccalaureate researchers. In addition to her work with GKM (Goresky-Kottwitz-MacPherson) theory and the cohomology of Hessenberg and flag varieties, she has recently become involved in two collaborations in combinatorial molecular biology that are examining how RNA folds. Her hobbies include playing ice hockey and hiking.

New Lecturer Welcomed

Allen Mann will join the department as a full-time lecturer in Fall 2015. Dr. Mann earned his Ph.D. in mathematics from the University of Colorado at Boulder under the direction of J. Donald Monk. He is currently a visiting assistant professor at Colgate University in Hamilton, NY. Previously, he worked for two years as the North American editor for Birkhäuser Science. From September 2008 to December 2010, he participated in the European Science Foundation project Logic for Interaction (LINT), whose goal was to develop mathematical foundations for the interaction of intelligent agents. In his spare time, he enjoys practicing yoga, hiking, camping, reading, and playing Go.

Promotion, Tenure and a Grant!

Congratulations go to Dr. John Krueger who was promoted to Associate Professor and Tenured this year. In addition to his tenure and promotion, he just received word that his NSF proposal "Forcing and Consistency Results" was just granted for the time period 2015-2018. All in all, a pretty good year for Dr. Krueger!

Pi Day in Denton

Since the first three digits of pi are 3.14, March 14th is designated as pi day. This year as part of Denton Public Library's celebration of pi day Dr. Joe Iaia and Dr. John Quintanilla gave presentations. Dr. Iaia spoke on "The discovery of pi in ancient times and how pi is used today" and Dr. Quintanilla led the activities for building Platonic Solids and a newspaper geodesic dome.

{ Number Facts

2014 Research by the Numbers:

In 2014, the department had 22 tenure/tenure track faculty members of which 20 had a research component to their workloads.

1 number of active conference grants from the National Science Foundation
2 number of conferences hosted by the department
3 number of postdocs
5 number of active research grants from Simons Foundation
7 number of active research grants from the National Science Foundation
12 number of undergraduate summer research projects
13 number of foreign countries where faculty members gave research talks (Argentina, Brazil, Canada, China, Czech Republic, France, Germany, Israel, Japan, Poland, Romania, UK, and Vietnam)
40 number of research papers published by faculty members

{ Department News

New Staff Members

Zaiba Ahmed is the Math department's newest staff member. She joined the Math team in February 2015 and she works as an Administrative Specialist II in the Math main office. Zaiba previously worked in the Admissions office at TWU as a data entry operator. Zaiba has a Bachelor's degree in Business Administration with two years of experience in office administration. Zaiba will be responsible for greeting visitors to the office, maintaining supply inventories, assisting staff members with projects, assisting staff with orientation & online placement testing and will function as the Xerox liaison for the department copiers. The department is excited about the addition to our team and looks forward to working with Zaiba.

Although we are sad that Carol Fichera left the mathematics department, we are happy to welcome Shina Roc-Bassett to replace Carol as the Math Lab Manager. Shina has an M.A. in Elementary Education from National Louis University. She has 8 years of teaching experience in K-12 and 8 years of experience as an Assessment Editor in Mathematics for the publisher McGraw-Hill. She has a passion in mathematics and in student learning of mathematics.

Staff Member Honored

Jana Watkins was nominated for the 2015 Steve Miller Outstanding Employee Award. The department appreciates Jana's dedication and hard work in making UNT a better place for students and employees.

AMC Competition

Each year the Mathematical Association of America offers the American Mathematics Competition to middle school and high school students. The AMC 8, AMC 10, and AMC 12 offer a challenging competition for students who have not yet completed grades 8, 10 and 12 respectively. The UNT mathematics department offered all three levels of the exam for the first time this year. A total of 50 students from area middle schools participated in the AMC 8 in November. Congratulations to all the students who participated in the AMC 8 and special recognition goes to Keith Spencer who made the top score at UNT. Unfortunately, bad weather made it difficult for all the students who planned to participate in the AMC 10 and 12 competitions to make it to the UNT campus. But even with the bad weather, three students competed in the AMC 10 and five competed in the AMC 12. Congratulations to Tony Gao and Jiyun Yao for winning first place among the UNT competitors in the AMC 10 and 12, respectively.

UNT Mathematics and Social Media

The Mathematics Depart entered the 21st Century by having a presence on Twitter and Facebook. Follow us at @UNTMATH on Twitter and UNT Mathematics on Facebook. We promise not to overwhelm you with postings!

{Alumni News

Congratulations to New UNT Graduate Mathematics Alumni

From the Spring 2014 until Spring 2015, the department awarded 7 Master's and 3 PhDs. The following is the list of graduate students who successfully defended their theses or dissertations.

NAME	ADVISOR	DEGREE
Sam McWhorter	Dr. Robert Kallman	Ph D May 2014
Thomas Gilton	Dr. John Krueger	MS May 2014
Yaya Traore	Dr. Kai-Sheng Song	MS May 2014
Jayantha Senadheera	Dr. Richter	Ph D Aug 2014
Jason Montgomery	Dr. Neuberger	Ph D Aug 2014
Ben Schwaighofer	Dr. Allaart	MS Aug 2014
Damon Gaddis	Dr. Quintanilla	MS Aug 2014
Jeff Lobe	Dr. Jackson	MS Dec 2014
Connie Chan	Dr. Shepler	MS May 2015
Adam Kiehl	Dr. Joe Iaia	MS May 2015

Where Are They Now?

UNT mathematics graduates live and work all over the world. Here is an update on a few recent graduates.
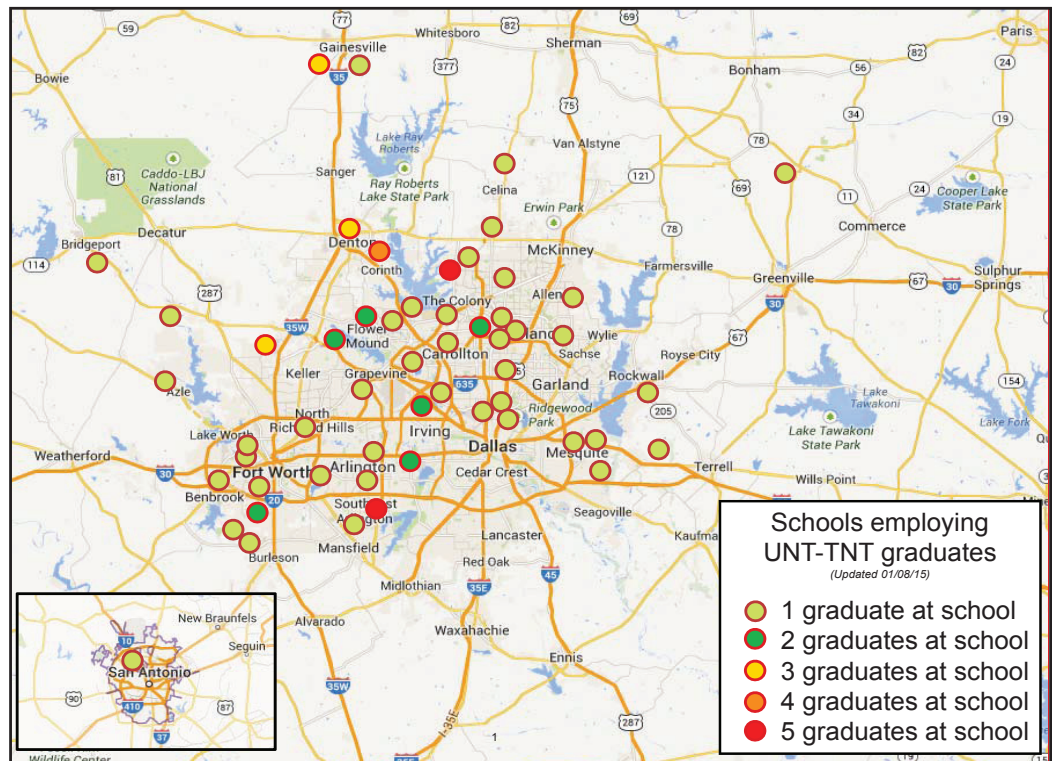
Dr. Rabin Dahal is now an Assistant Professor at Texas College Tyler. Dr. Jayantha Senadheera returned to Sri Lanka, his home country where he is a lecturer at the Open University of Sri Lanka. Dr. Dan Walker is getting ready to move to Maryland where he will be employed with the Department of Defense. Subrat Pathak works at a consulting company in New Jersey. Miah JnCharles is with Santander Consumer, a leading automotive financing company in Dallas. Jose-Luis Paukner-Moron works at a consulting company in Argentina. Yaya Traore works at a large international company in Mali. Thomas Gilton is going to UCLA as a PhD student to study logic and set theory. Damon Gaddis is a PhD student in the STEM Ed program at UT Austin. Ben Schwaighofer is an adjunct instructor for us this year.

Teach North Texas!

The Teach North Texas program was developed through a grant to replicate the UTeach program at the University of Texas at Austin. This successful and innovative program trains preservice middle school and high school STEM teachers to incorporate discovery learning techniques into their classrooms. Dr. John Quintanilla of the mathematics department is a founding and current co-director of TNT. To date, 100% of the TNT alumni who want to be secondary mathematics teachers are now employed teaching mathematics. Here is a map showing where TNT graduates are teaching.

Web Site to Help Mathematics Teachers

Dr. John Quintanilla keeps a blog focused on mathematics. The purpose is to provide UNT mathematics alumni (and anyone else who is interested) with information and tips on classroom teaching and inspiring students. Check it out at meangreenmath.com.

Schools employing UNT-TNT graduates
(Updated 01/08/15)

- 1 graduate at school
- 2 graduates at school
- 3 graduates at school
- 4 graduates at school
- 5 graduates at school

{ Graduate Student News

Tuition Reduction for Grad Students

Good news from UNT's Toulouse Graduate School! Beginning in Fall 2015, UNT will pay the tuition for two courses every term for all supported graduate students working for the math department. For more information please contact the Graduate Advisor, Charles Conley at Charles.Conley@unt.edu

Algebra Symposium Organized by Graduate Students

With 25 registered participants spanning 3 universities and 2 states, the Algebra Symposium was held at the University of North Texas on February 21, 2015. The six talks given by graduate students from the University of Oklahoma, the University of Texas at Arlington, and the University of North Texas covered algebra topics including representation theory, Lie algebras, reflection groups, and elliptic curves.

The Algebra Symposium is a conference series that began in Fall of 2010, jointly with Baylor and Texas A&M. This year UNT initiated the extension of the symposium to also include graduate students from OU and UTA. The Symposium was organized by UNT graduate students Ojas Davé and Christine Uhl.

UNT Graduate Exhibition

On Saturday March 7, 2015 UNT Math graduate student Viktoriya Golubenko and 2 other UNT co-researchers did a poster presentation about their research project "A bioinformatic approach to fighting influenza", at the UNT Graduate Exhibition. The research was aimed at finding new ways to fight influenza by studying how the influenza H1N1 virus has changed within the last 80 years at the genomic level.

Graduate Student Honored for Presentation

UNT Math graduate student Ed Krohne has won an honorable mention award for his talk given at the BEST conference (Boise Extravaganza in Set Theory), held as a symposium of the 95th Annual Meeting of the American Association for the Advancement of Science – Pacific Division (AAASPD). The meeting was held on June 18-24, 2014 at the University of California, Riverside. Ed talked about his research results on Borel chromatic numbers.

Graduate Student Publishes Results

Caleb Ziegler published the research article On Polynomial-Time Relation Reducibility in the Notre Dame Journal of Formal Logic. A third-year graduate student, Caleb has studied computational complexity since his undergraduate days.

New Graduate Students

The department welcomed 7 new supported graduate students last Fall. All of them came with excellent credentials. Among the new grad students, Azam Nouri was awarded a John Neuberger Scholarship for 2014-2015. Ms. Nouri has an M.S. in Mathematics from Shahid Beheshti University, Tehran, Iran.

{ Undergraduate News

Math Club

Members of the UNT Math Club will comprise the Calculus Bowl Team that will compete at the Texas Section Meeting of the MAA (Mathematical Association of America) on April 9th in San Antonio. Coached by Dr. Joseph Iaia, the team includes Ashley Miller, Mark Fincher, Bobby Barnes, and Joshua Zimmerman. No matter which way you slice it, this bowl should hold volumes of fun for the team.

Comprised mostly of undergraduate math majors, the Math Club meets on Fridays at 2pm to discuss mathematics informally, play games, and plan social events like the Math Club Picnic. For more information on the Math Club see http://math.unt.edu/news/seminars/math-club.
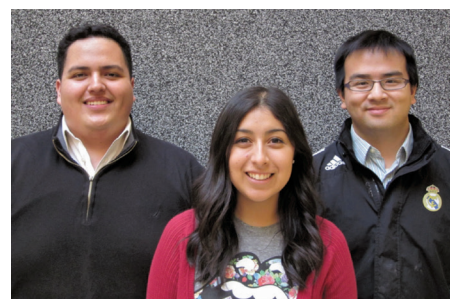
Actuarial Science

Congratulations to our recent graduates, Alex Pax, Dominic Nguyen, and Peter Garrett, who are now actuarial analysts with insurance companies or consulting firms in the Dallas-Fort Worth metroplex. Also, congratulations to Martha Carreon and Emily Deacon for landing summer internships with Blue Cross Blue Shield and AON.

The actuarial profession is consistently ranked as one of the best careers based upon factors such as salary, work environment, and job outlook. What does an actuary do? They analyze the financial costs of risk and uncertainty. For more information about being an actuary, visit www.beanactuary.org. If you are interested in the Undergraduate Academic Certificate in Actuarial Science, contact Dr. Huguette Tran in the Department of Mathematics.

Mathematical Modeling

Coached by Professor Jay Liu, the UNT MCM (The Mathematical Contest in Modeling) teams successfully competed in the spring 2014 competition winning Honorary Mention. The teams consisted of four TAMS students: Team1 - Shawn Hu and Sayon Sengupta, and Team 2 - Neil Danait and Anita Rao. Congratulations to both teams.

This year UNT has one MCM team, consisting of three students: Luis Condado, Beier Lu, and Jessica Martinez. May their performance be a model for success!

Problem of the Month

Every month during regular semesters, the UNT Math Department and the UNT Math Club feature the problem of the month. The competition is open to all currently enrolled undergraduate students. For correct written submissions of solutions, winners receive cash prizes and certificates of excellence. Winners/Runners up during the 2014/15 school year include Tamaki Ueno, Murray Lee, Steven Grigsby, Mark Fincher, and Zachary Gardner. For more information on the problem of the month go to http://math.unt.edu/problem-of-the-month.

Study Abroad

Jared L. Hilliard has been spending this spring semester immersed in mathematics in the heart of Moscow. Jared is participating in the Math in Moscow program with scholarship support from the American Mathematical Society. Math in Moscow is one of two renowned study abroad programs focused on mathematics. Although mathematics instruction in Math in Moscow is conducted in English, Jared has spent two and one-half years studying Russian language here at UNT in preparation for this experience. He expects to graduate in May with a Bachelor of Science in Mathematics and a minor in Russian. Jared is currently applying for Ph.D. programs in mathematics and plans a career as a mathematician. He was also this year's recipient of the UNT Mildred Masters McCarty Scholarship in mathematics.

Integration Bee

The Integration Bee began in the late 1980's and was the brainchild of former faculty member and now Deputy Division Director at the NSF, Hank Warchall. Since then some of the organizers, in addition to Warchall, have been Alex Clark, William Cherry, and Joseph Iaia.

The bee works similar to a spelling bee – students are given an indefinite integral to evaluate within one or two minutes. A student is eliminated from the bee if he or she misses two problems. Traditionally, there have been prizes for the top three students.

This year's Integration Bee will be held on Friday, April 17. Prizes will be $75 (first place), $50 (second place), and $25 (third place) tuition credits that can be used toward UNT tuition. For more information, see http://math.unt.edu/integration-bee.

RTG Math Scholars Program

Every summer undergraduate students are invited to apply to do research with mathematics faculty members for a period of five weeks or more. In summer 2014, the following students were selected to participate in the RTG SUMS (Research Training Group - Undergraduate Mathematics Math Scholars Program) which included receiving a stipend: Devon Richards, Suna Kim, Heather Olney, Paul Teszler, Dylan Cooney, Michael Hanson, Jared Hilliard, Trent Watson, Allison Birdsong, Trevor Davila, Ashley Miller, Addison Mink, and Aidan Young. Six faculty supervised research projects in analysis, algebra, number theory, set theory, and mathematical biology.

It is also worth mentioning that previous research conducted during the RTG summer program has produced papers accepted for publication. Mark Fincher and Heather Olney wrote a paper with Dr. William Cherry entitled "Some projective distance inequalities for simplices in complex projective space." This was based on work supported by the RTG SUMS fellowships for summer 2013. The paper will be in a forthcoming issue of the mathematical journal Involve. To find out more, see http://msp.org/scripts/coming.php?jpath=involve.

Putnam Competition

This year Mark Fincher and Ashley Miller participated in the Putnam Exam. Mark and Ashley Miller are not new to the competition and they are anxiously awaiting the results which are expected any day.

{ Department Awards

2014 Departmental Awards and Scholarships

Faculty Awards:

Faculty Research Award:	Dr. Olav Richter
Faculty Teaching Award:	Dr. John Quintanilla and Ms. Lucia Liu
Faculty Service Award:	Dr. Charles Conley and Ms. Krista Hines

Graduate Awards:

Outstanding Teaching Fellow Award:	Tim Wilson
Outstanding Graduate Student Award:	Caleb Ziegler
Academic Excellence Award:	Edward Krohne and Yujie Yan

Undergraduate Awards:

Dawson Scholarship:	Ashley Miller
Hanson Scholarship:	Mark Fincher
McCarty Scholarship:	Kelley Nguyen
Perry Scholarship:	Tracy Leeper
Outstanding Undergraduate:	Heather Olney
Outstanding Student in Actuarial Science:	Ashley Miller
Outstanding Math Tutor:	Tamaki Ueno

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Department of Mathematics
1155 Union Circle #311430
Denton, TX 76203-5017

I would like my gift to support the following areas in the amounts specified:

$_____   Mathematics Department Fund: An expendable fund that enables the chair to support department priorities such as faculty recruitment, outreach activities, research visitors, student events and conferences.

$_____   John Ed Allen Scholarship $_____   The Dan Mauldin Endowment for Student Excellence

$_____   David F. Dawson Scholarship

$_____   E. H. Hanson Scholarship $_____   Mildred Masters McCarty Scholarship

$_____   Joseph P. S. Kung Scholarship $_____   John W. Neuberger Scholarship

$_____   Roger L. Perry Scholarship

☐ **I would like to make this donation anonymously.**

In addition to these funds which support a variety of department programs, we benefit from campus-wide funds that support undergraduate scholarships and graduate student fellowships. We invite friends of the department to contribute to an existing fund or to contact the chair to discuss creating a new fund for a specific purpose. Thank you for supporting the activities of the UNT Department of Mathematics.

Please Tell Us!

Your classmates and the UNT Department of Mathematics would love to know what important things are going on in your life, and we welcome your submissions for the Class Notes section of Math News, as well as for our Website. Email your updates to **mathchair@unt.edu**. We look forward to hearing from you!

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