Chair's Column

Su Gao

Dear members and friends of the UNT Math Department,

I am proud to present to you another issue of Math News, the UNT Math Department Newsletter. From student achievements to new faculty, from our new outreach activities to the Outstanding Department Award, everything in this newsletter points to an upward trajectory the department is actively taking!

The biggest news around campus this year is that UNT is now an R1 university!

R1 is a buzzword used by the Carnegie Foundation for their classification of institutions of higher education as standing for "Research I: Doctoral University with the Highest Research Activity." UNT is now among the nation's top 115 universities with the R1 status.

This year UNT is also celebrating its 125th anniversary. The university has come a long way since its foundation in 1890, and landing in the category of the nation's top research universities is a nice way to summarize the last 125 years of effort of the entire university community, including all faculty, staff, and students.

Analysis has shown that the new classification of UNT in the top category was primarily because of our success in doctoral education. This success can be clearly seen within the department as well. With 6 PhDs graduating this year, which doubles our PhD production from just a few years ago, the department has contributed significantly to the university's overall success. And it's not just about numbers: our PhD graduates are proving theorems, publishing papers, making conference presentations, writing strong dissertations, having job interviews, and receiving offers!

And yet this is only one aspect of the department's accomplishments in its many educational, research, and community outreach missions. I invite you to explore this newsletter to find out more about the department.

Su Gao
Professor and Chair

{ Table of Contents

Research Project Involving Undergraduates, Graduates, and Faculty

In Summer 2015, faculty members Lior Fishman and Steve Jackson and graduate student Logan Crone served as mentors for an RTG Undergraduate Math Scholars (UMS) project focused on the interplay of number theory and descriptive set theory. Besides Lior, Steve, and Logan, the project also included the graduate student Devon Henkis, together with the undergraduate students Thomas Calkin, Jill Kaiser, Emily Mills, and Noah Morrow.

The project studied set theoretic aspects of "Schmidt's game," a powerful tool widely used in number theory. Schmidt's game, which was invented by W. Schmidt in 1966, is a two player game for which the "winning" of one of the players on certain subsets of the space reveals important information related to number theoretic properties of the space. One may think of Schmidt's game as played on Euclidean space with two players choosing a pair of real numbers in their turn under some constraints. Now suppose we know that one of the players has a winning strategy. Will the player also have a winning strategy under the added constraint that the pair chosen must be rational numbers?

As it turned out, this question was anything but trivial, but the group managed to make significant progress towards answering it. After the UMS project was completed, Lior, Steve, and the graduate students continued to work on the problem during Fall 2016, and are currently preparing their results in a paper to be submitted for publication.

{ Faculty News

New Assistant Professor
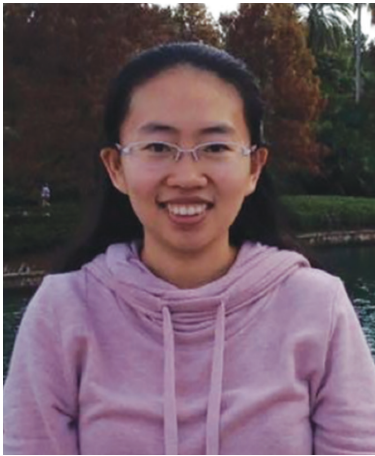
Han Hao will join the department as an assistant professor in Fall 2016. Han is currently a Ph.D. student in statistics at the Pennsylvania State University under the direction of Rongling Wu and Runze Li. Her research interests are in statistical genetics and systems biology.

In her spare time, Han enjoys classical music and bird watching.

New Lecturer

Nirmala Naresh will join the department as a full-time lecturer in Fall 2016. Originally from India, Dr. Naresh received a Ph.D. in Mathematics Education from Illinois State University. She is a recipient of an NSF funded Service, Teaching, and Research (STaR) fellowship. Currently, Dr. Naresh is an associate professor in the Department of Mathematics at Miami University. Naresh's research interests lie in the domains of ethnomathematics and the teaching and learning of probability & statistics. She is an active member of the National Council of Teachers of Mathematics and the Association of Mathematics Teacher Educators. In her free time, Nirmala enjoys listening to music, cooking, and watching cricket.

Yale Educator Award

Dr. Kiko Kawamura, a senior lecturer in the department, was one of 51 teachers in the world recognized in 2015 with a Yale Educator Award. Dr. Kawamura was nominated for the award by Anushree Agrawal for her work teaching and mentoring students in the Texas Academy of Mathematics and Science.

Promotion to Full Professor

Congratulations to Dr. Olav Richter for being promoted to full professor, beginning Fall 2016. Dr. Olav Richter jointed UNT as an assistant professor in 2001, and was promoted to associate professor in 2007. Dr. Richter's research in number theory focuses on automorphic forms, and he has a strong interest in Jacobi forms, Siegel modular forms, Maass forms, and mock theta functions and related topics. His research is currently supported by a Simons Collaboration grant.

{ Number Facts

2015 Research by the Numbers:

In 2015, the department had 23 tenure/tenure track faculty members of which 19 had a research component to their workloads.

1 number of conferences hosted by the department

3 number of postdocs

5 number of active research grants from Simons Foundation

8 number of active research grants from the National Science Foundation

9 number of undergraduate summer research projects

9 number of foreign countries where faculty members gave research talks
     (Austria, Canada, China, France, Germany, Japan, Poland, Romania, and UK)

15 number of research journals where faculty members serve on the editorial boards

35 number of research papers published by faculty members

{ Department News

Mathematics Receives Outstanding Department Award

University leaders honored the mathematics department with an Outstanding Department award at the May 7, 2015 Staff Sack Lunch. President Neal Smatresk and Provost Finley Graves recognized the Mathematics department for its work to reduce class sizes and provide more supplemental instruction to help students succeed.

New Staff Member

Kim Manzer is the Mathematics department's newest staff member. Kim joined the Math team in July 2015 and works as an Administrative Specialist IV managing the Math Lab and the Math Quest Center. She is also responsible for staffing the labs with UTAs, tutors, graders, and monitors. Kim has a Bachelor's degree in Business Administration and previously worked for sixteen years at the College of Business here at UNT. We are glad to have Kim join the Math team and look forward to working with her.

TORA VII Conference

TORA VII took place at UNT from Apr 8-10, 2016.

Texas-Oklahoma Representations and Automorphic forms (TORA) is an NSF-funded conference series hosted in rotation by Oklahoma State University, the University of Oklahoma, and the University of North Texas. These are weekend conferences, which feature two invited plenary speakers and one invited junior speaker each meeting.

The TORA meetings bring together the automorphic forms and representation theory community of the South Central region to hear about recent research in automorphic forms and representation theory. TORA VII (http://www.math.unt.edu/~richter/TORA/TORA7.html) just took place at UNT from Apr 8-10, 2016. It was the largest TORA meeting thus far with 64 participants coming from China, India, Sri Lanka, Sweden, and the US.

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 second time this year. A total of 30 students from area middle schools participated in the AMC 8 in November. Congratulations to all the students who participated in the AMC 8. A special recognition goes to Tyler Burkhardt who made the top score at UNT. In future years we hope the participation in the AMC 10 and 12 competitions will improve. Congratulations to Pranav Veera for winning first place among the UNT competitors in the AMC 10.

UNT Mathematics and Social Media

The Math department 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

Teach North Texas

Teach North Texas program produces graduates with not only a major in mathematics but also with a secondary teacher certification. Every TNT graduate who wanted to be a secondary mathematics teacher is currently employed as a teacher, working mostly in the DFW metroplex.

TNT extensive training includes teaching mathematics to students with disability. The training requires students to modify a lesson plan to accommodate the students with disability. TNT students noted that learning to adjust the lesson plan would probably be beneficial to all of their future students and not just the students with special needs.

TNT math majors Alexandria Fisher, Brittany Tripp, and Esmerelda Sheran

Appalachian Set Theory Scribe

Congratulations to alumnus Thomas Gilton for being chosen to be the official scribe for the Appalachian Set Theory meeting in April, 2016 at Virginia Commonwealth University. The Appalachian Set Theory meetings are a series of workshops, usually three per year, which are devoted to a single topic in set theory over an intense day-long meeting with a single speaker.

Thomas Gilton graduated with an M.S. degree in Spring, 2014, under the supervision of Dr. John Krueger. His Master's project evolved into a paper which was submitted for publication in Fall 2015. Currently Gilton is a Ph.D. student at UCLA, studying set theory.

Congratulations to New UNT Graduate Mathematics Alumni

Graduate	Degree		Advisor	Graduate	Degree		Advisor
Angela Berardinelli	PhD	Aug 2015	Douglas	Jose Islas	PhD	Dec 2015	Allaart
Joseph Czop	MS	Aug 2015	Allaart	Devon Henkis	MS	Dec 2015	Jackson
G. Tony Jacobs	PhD	Aug 2015	Fishman	Viktoriya Golubenko	MS	May 2016	Azad
Koshal Dahal	PhD	Aug 2015	Sari	Edward Krohne	PhD	May 2016	Gao and Jackson
Rachid Atmai	PhD	Aug 2015	Jackson	Cheng Chang	PhD	May 2016	Gao
Chris Ball	MS	Aug 2015	Fishman	Thu Le	MA	May 2016	Cherry

Where Are They Now?

UNT mathematics graduates live and work all over the world. Here is an update on a few them.

- Dr. Jeannette Larsen (PhD 2012) is now an adjunct at CTC, a largely military school in Killeen.
- Dr. Rabin Dahal (PhD 2013) is now a Senior Lecturer at UT Dallas.
- Dr. Rachid Atmai (PhD 2015) is now a post-doc at the Kurt Gödel Research Center in Vienna.
- Dr. Angela Berardinelli (PhD 2015) is now an Assistant Professor at Mercyhurst University.
- Dr. Tony Jacobs (PhD 2015) and Dr. Jose Islas (PhD 2015) are now adjunct instructor for us.
- Dr. Brandon Seward (MA 2009) went on to get his PhD from the University of Michigan in 2015. He is currently is a postdoc at the Hebrew University of Jerusalem, and in Fall 2016 he will join the Courant Institute of Mathematical Sciences as an Assistant Professor/Courant Instructor.
- Dr. James Pascoe (UNT undergraduate class of 2009) finished his PhD at the University of California at San Diego in 2015 and is now a William Chauvenet Lecturer at the Washington University in St. Louis. He just received a NSF postdoctoral fellowship for his work in operator theory and several complex variable.
- Stephen McKeown (UNT undergraduate class of 2007) is finishing his PhD at the University of Washington, and this Fall he will start a 3-year RTG post-doc at Princeton University.

{ Graduate Student News

Algebra Symposium

The Algebra Symposium was held November 14, 2015 at the University of Texas at Arlington and on March 5, 2016 at the University of Oklahoma. This conference series began in 2010 with Baylor, Texas A&M, and UNT and rotates being hosted by participating universities. In 2013, UNT invited UTA and OU to join. Since 2013, the symposium has been held every semester and will return to UNT in Fall 2016. The symposium is held on a Saturday during the semester and consists of talks given by graduate students over their research or a topic of interest within algebra.

In the fall at UTA, there were 11 talks given by graduate students from A&M, OU, UNT, and UTA. The talks covered topics including Hochschild cohomology, representation theory, and geometry. Drew Tillis gave a talk about Induced Modules in the Decomposition of the Group Algebra of the Hyperoctahedral Group. Ojas Davè spoke on Irreducible representations of a specialized Hecke algebra. Connor O'Dell talked about Infinite Dimensional Lie Algebras and Cohomology. This spring there were 8 talks including topics like modular forms, categorification, invariant theory, and fixed point properties. Chelsea Drescher spoke about Invariants of GL(n,q) in Polynomial and Quotient Rings.

Graduate Student Publishes Result

James Martin (jointly with former UNT graduate student Jayantha Senadheera) published the research article Differential operators for Hermitian Jacobi forms and Hermitian modular forms in the Ramanujan Journal. James expects to graduate during Summer 2016.

New Graduate Students

The department welcomed 9 new fully supported graduate students last Fall. All of them came with very good credentials. Among the new grad students, Naomi Krawzik was awarded the prestigious Robert B Toulouse University Scholarship for 2015-2016. Ms. Krawzik has an MS in Mathematics from Sam Houston State University.

{ Undergraduate News

Math Club

The math club, consisting mostly of undergraduate math majors, meets every Friday from 1 to 2 p.m. in 473 GAB to discuss mathematics informally, interact, and play games. The math club organizes each semester a picnic at North Lakes Park. Soccer, croquet, and ultimate frisbee are among the favorite activities at this fun social event. For more information about the math club, go to http://math.unt.edu/news/seminars/math-club.

Actuarial Science

In November, with the assistance of the Actuarial Science Club, the Math department hosted a presentation by four actuaries from AON. Among these four actuaries, David Ellis, Eduardo Espinola, and Alex Pax are UNT alumni.

The actuarial exams administered by the Society of Actuaries are very difficult exams. Congratulations to Tsegazeab Gebreyohannes and Ashley Miller. TG passed both the P (Probability) and FM (Financial Math) exams and AM passed the FM exam during the last year. Also congratulations to Ashley who will join AON after her graduation.

Actuarial students Lindsey Whiting, Ashley Miller, and Tsegazeab Gebreyohannes with AON actuaries

Mathematical Modeling

Each year, students at UNT compete in the Mathematical Contest in Modeling (MCM). The UNT MCM team is coached by Professor Jay Liu. In Spring 2016 Jeffrey Huang, Zachary Simpson, and Steven Yuan competed for five days, January 28 – February 1, and they are awaiting the results.

Problem of the Month

Every month during regular semesters, the math department and the math club feature the problem of the month competition. This contest is open to all currently enrolled undergraduate students. Students who submit correct solutions receive cash prizes and certificates of excellence. Winners and runner ups during the 2015-16 academic year include ShuHui Jiang, Xiangyu Kong, William Liu, Brandon Ohl, and Tamaki Ueno. For more information, go to http://math.unt.edu/problem-of-the-month.

Integration Bee

The integration bee is a contest for undergraduate and high school students, which tests skills in evaluating indefinite integrals. It takes place each spring, and this year was on April 15. The current organizer of the integration bee is Joseph Iaia. The 2015 winners were Tony Liu, Anirban Sarkar, and Bryan Xie, who are all TAMS students. Prizes are $75, $50, and $26 for first, second, and third place respectively, and the prize money can be used towards UNT tuition. For more information, go to http://math.unt.edu/integration-bee.

Putnam Competition

The 2015 Putnam Exam took place in December, 2015. UNT undergraduate students Mark Fincher, Ashley Miller, and Andrew Sansom participated, and are currently waiting for their results. The Course 3010 is a one credit hour course designed to prepare students for the Putnam exam, and has recently been taught by Joseph Iaia and Pieter Allaart.

RTG Math Scholars Program

The RTG Math Scholar Program (UMS) was held Summer 2015 and in previous summers. Undergraduates were invited to apply to work on undergraduate research with math department faculty for several weeks over the summer. In 2015, four faculty members and five graduate students worked with nine undergraduate students on three projects, covering the topics of descriptive set theory and Diophantine approximation, statistical tools in genome research, and number theory with an emphasis on normal numbers. Undergraduate participants in 2015 include Dylan Airey, Rachel Ballard, Thomas Calkin, Martha Carreon, Jill Kaiser, Anagha DKrishnan, Emily Mills, Noah Morrow, and Aidan Young, and their faculty mentors were Rajeev Azad, Lior Fishman, Steve Jackson, and William Mance.

Calculus Bowl

On March 31, three students from UNT's Math Club - Joshua Zimmerman, Ashley Miller, and Deanna Pierce - participated in the Calculus Bowl which occurs every year at the Texas section meeting of the Mathematical Association of America. This year's conference was held at Stephen F. Austin University in Nacogdoches, Texas. 33 teams participated in the bowl.

Our team did well but did not advance to the final round. Just wait until next year!

{ Department Awards

2015 University and Department Awards and Scholarships

Department Faculty Awards

Faculty Research Award:	Dr. John Krueger
Faculty Teaching Award:	Dr. Anne Shepler and Dr. Huguette Tran
Faculty Service Award:	Dr. Joseph Iaia and Ms. Lucia Liu

University Graduate Awards

Faculty Senate Outstanding Teaching Fellow Award:	Cheng Chang

Department Graduate Awards

Outstanding Graduate Student Award:	Christine Uhl
Academic Excellence Award:	Cody Dance

University Undergraduate Awards

Outstanding Undergraduate:	Thomas Calkin
Outstanding Student in Actuarial Science:	Lindsey Whiting
Outstanding Math Tutor:	Cody Olson

Department Undergraduate Scholarships

Dawson Scholarship:	Jillian Greene
Hanson Scholarship:	Deanna Pierce
Hanson Scholarship:	Samantha Stodola
Perry Scholarship:	Ashley Stensgard
John Ed Allen Scholarship:	Heidee Nichol

{ You Can Help!

I want to support the UNT Department of Mathematics.

Name _____

Address _____

City_____ State_____ Zip_____ Country _____

E-mail _____ Phone (_____) _____

Enclosed is my check for $_____.

Please make check payable to the University of North Texas.

Please charge $_____ to my:

Visa   MasterCard   Discover   American Express

_____
Card Number   Exp. Date   Signature

Please mail contribution to:

University of North Texas
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

$_____   David F. Dawson Scholarship

$_____   E. H. Hanson Scholarship

$_____   Joseph P. S. Kung Scholarship

$_____   The Dan Mauldin Endowment for Student Excellence

$_____   Mildred Masters McCarty 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!

Name_____ E-mail Address _____

Degrees from UNT and Other Universities/Years_____

_____

Current Firm/Institution _____

Position/Research Area _____

Other Information about Yourself (family, hobbies, and past positions):_____

_____

_____

Thank you to our donors!