

SPRING 2018

Chair's Column



Dear members and friends of the UNT Math Department,

The College of Science is approaching its first birthday! Su Gao has been appointed to be its regular dean, and he and John Quintanilla, the associate dean for undergraduate studies, have taken on their new roles energetically.

Our graduate students have been working hard: this year we awarded eight M.S. and six Ph.D. degrees, and Chelsea Drescher was named one of UNT's four Outstanding Teaching Fellows. In his first year as graduate

Charles Conley

advisor, Olav Richter has recruited an impressive group of new graduate students.

This year we have seen more people than usual come and go. Joseph Kung retired in January, and it was very moving to meet so many of his students and friends at the ceremony in his honor. We wish him all the best. In the office, Carol Fichera retired after working for us as mathlab manager and later graduate program assistant, and Laura Carson moved on to work for the college. Maegan Garcia moved from the front desk to become our graduate program assistant, and Kim Willis joined us as travel and grants coordinator.

Concerning our faculty, the provost has recommended that Allen Mann be promoted to senior lecturer, Marc Grether be promoted to principal lecturer, and Su Gao be named regents' professor. This fall Nam Trang will join us as an assistant professor specializing in logic.

It is with sadness that we learned of the passing of two former colleagues, Beth Bator and David Appling. Both were important teachers, mentors, and researchers in the department for many decades, and we will miss them.

On the research front, UNT hosted the Fall 2017 Central Section Meeting of the American Mathematical Society. The last AMS section meeting UNT hosted was in 1990! And congratulations go to Su Gao, Steve Jackson, and Helen Wang, who have recently been awarded major research grants. Last but not least, this year Steve Jackson will speak at the International Congress of Mathematicians!

*Charles Conley
~ Chair*

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International Congress of Mathematicians



Professor Jackson has been invited to give a lecture at the 2018 International Congress of Mathematicians (ICM). The ICM, which is held every four years, is the largest and most prestigious mathematics conference in the world. Some of the most important prizes in mathematics, including the Fields Medal, the Nevanlinna Prize, the Gauss Prize, and the Chern Medal, are awarded at the conference. Being invited to speak at the ICM is one of the greatest honors that can be bestowed upon a mathematician. The 2018 ICM will be held on August 1–9, 2018, in Rio de Janeiro, Brazil. Dr. Jackson is an invited speaker in the Logic and Foundations section of the conference. He is the first UNT mathematics faculty member to be invited to speak at the ICM. He plans on presenting an overview on progress in descriptive set theory including both from the determinacy/large cardinals perspective as well as the theory of definable equivalence relations.

Professor Jackson received his Ph.D. in 1983 at UCLA under the direction of Donald Martin. He came to UNT in 1989, and became a full professor in 1998. In 2005 he was awarded the prestigious designation of regents' professor. His research is in mathematical logic, set theory, and descriptive set theory. Much of his most notable work has involved the descriptive set-theoretic consequences of the axiom of determinacy. In recent years, he has also made important contributions to the theory of Borel equivalence relations and to the interaction between descriptive set theory and dynamics. In 2002 he solved, together with UNT Professor Emeritus Dan Mauldin, the well-known Steinhaus lattice problem. His publications appear in highly rated journals, including several in some most prestigious journals in mathematics, including *Inventiones Mathematicae* and *Proceedings of the National Academy of Sciences*.

{ Faculty News

Joseph Kung Retires

Professor Joseph Kung



retired this year after a long and distinguished career at UNT. He received his Ph.D. in applied mathematics from the Massachusetts Institute of Technology under the direction of Professor Gian-Carlo Rota. An expert in combinatorics, Dr. Kung has published over fifty research articles in areas such as matroid theory and classical invariant theory. He also co-authored a book, *Combinatorics: The Rota Way*, with Rota and Catherine Yan.

Dr. Kung is famous for his love of cats and his collection of harpsichords. His contributions to the department include advising seven Ph.D. students, ten Master's students, and the creation of the capstone course Math 3870 Inventing Statistics. He also served as Editor-in-Chief of the journal *Advances in Applied Mathematics* and received research grants from the National Science Foundation and the National Security Agency.

In honor of his retirement, members of the department purchased a brick that will be placed in front of the University Union. In addition, nearly \$1000 was donated in Dr. Kung's name to various department scholarship funds.

New Assistant Professor

Nam Trang



will join the department in Fall 2018 as an assistant professor. Nam received his Ph.D. in mathematics from the University of California, Berkeley in 2013. His advisor was John Steel. After receiving his Ph.D., he was a postdoc at Carnegie Mellon University from 2013 to 2015 and a postdoc at the University of California, Irvine from 2015 to 2018. Nam is the PI of an NSF standard grant, which he was awarded in 2016. His research interests are in mathematical logic, set theory, and inner model theory.

Grants

Several faculty members were awarded external grants this year. Su Gao and Steve Jackson received a National Science Foundation grant for their proposal “Descriptive Dynamics and Borel Combinatorics of Group Actions” for 2018–2021. Helen Wang was awarded a grant from the National Institutes of Health to fund her project “Mitigating Long-Term Treatment Related Morbidity in Childhood Cancer Survivors” for 2018–2025. Charles Conley received a Simons Collaboration Grant for his proposal “Contact Schwarzians, Extremal Projectors, and Infinitesimal Characters” for 2017–2022.

Promotions

Professor Su Gao was selected for the prestigious designation of regents’ professor this year; final approval for the designation will be made by the Board of Regents in May. Allen Mann was promoted to senior lecturer, and Marc Grether was promoted to principal lecturer. Congratulations to Su, Allen, and Marc for their hard-earned achievements.

AWM Workshop

The Association for Women in Mathematics (AWM) held its annual workshop at the 2018 Joint Mathematics Meetings on January 10–13, 2018 in San Diego, California. During the workshop there was a Special Session on Noncommutative Algebra and Representation Theory. The Special Session was organized by Dr. Anne Shepler from our department together with Dr. Sarah Witherspoon of Texas A&M.

{ Number Facts

2017 Research by the Numbers

23 tenure/tenure-track faculty members

39 research papers published by faculty members

4 research grants from the Simons Foundation

6 research grants from the National Science Foundation

7 foreign countries where faculty members gave invited research talks (France, Germany, Hong Kong, Italy, Moldova, United Kingdom, and Vietnam)

2 postdocs

1 conference hosted by the department

16 research journals where faculty members served on the editorial board

{ Department News

New Staff Members



Maegan Garcia joined the Department of Mathematics in October 2017 as an Office Support Associate. She previously ran a math learning center in Southlake for two years. In March 2018, Maegan was promoted to Graduate Program Administrator/Class Scheduling Assistant for the department. Maegan earned her bachelor's degree in mathematics with a minor in economics from UNT.



Kim Willis joined the department as the Grant and Travel Coordinator in January 2018. She previously served for 17 years as the Assistant Director of the Center for Teaching Excellence and Learning at Bradley University in Peoria, IL. Kim received her bachelor's degree in kinesiology from the University of Michigan, Ann Arbor, where she received a full athletic scholarship. She earned her master's degree in literature from Bradley University.

Staff Award

Congratulations to Jana Watkins for receiving the UNT Star Performer award in August 2017. Jana has been employed with UNT since 2007 and joined the Mathematics Department in July 2011.

Departures

Carol Fichera retired in December 2017 and was the department's previous Graduate Program Assistant/Class Scheduling Assistant. Laura Carson, who served as the department's Grant and Travel Coordinator, left the department in Fall 2017 to work as a College Research Officer in the new College of Science.

AMS Sectional Meeting

The University of North Texas hosted an American Mathematical Society (AMS) Sectional Meeting on September 9–10, 2017. The AMS holds eight sectional meetings annually. There is one meeting in the spring and one in the fall in each of the four major geographical regions of the U.S. The meeting at UNT was the fall meeting for the central US region. Eight of our faculty members organized special sessions at the meeting, and five of our faculty gave invited talks. For a list of graduate student talks, see the Graduate Student News below.

Obituaries

William David Love Appling passed away October 16, 2017. David was a professor in the mathematics department and retired in the 1990's. David was born in Evanston, Illinois, and moved to Texas when he was very young. He received his Ph.D. from Hubert Wall at UT Austin in 1958. David taught at Duke before coming to UNT. While at UNT, David graduated four Ph.D. students and was a very popular teacher. He was an active researcher in analysis with 69 publications.

Beth Bater passed away on January 9, 2018. Beth received her Ph.D. from Penn State in 1983 and taught her entire career at UNT. Her area of research was Banach spaces and she often worked with Paul Lewis and Russell Bilyeu. She graduated three Ph.D. students and she was an effective and popular teacher. Beth often taught in the TAMS program. Beth loved playing tennis and bowling as well as socializing with her many friends. Beth retired around 10 years ago and moved to Wichita Falls where she lived for the remainder of her life.

Social Media

The Department of Mathematics 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

Alumni Highlights

Stephen McKeown, a 2007 graduate with a B.S. in Math and Physics, went to Yale Law School following his time at UNT. After graduating from Yale, Stephen returned to mathematics and enrolled at the University of Washington for graduate studies. He worked on his dissertation with Robin Graham, completing his Ph.D. in 2016. Stephen recently visited the UNT math department, giving a Millican talk on Conformal Geometry, Holography, and Corners in November of 2016. He is currently working as a Postdoctoral Research Associate at Princeton.

Brandon Seward received a B.S. in December 2008 and an M.A. in July 2009 in mathematics from UNT, where he worked with Professor Su Gao. He went on to the University of Michigan, completing his Ph.D. in 2015 under the supervision of Ralf Spatzier. After a year spent as a Postdoctoral Fellow at the Hebrew University of Jerusalem, Brandon is now an Assistant Professor at the Courant Institute in New York. He describes his research interests as focusing on entropy theory for probability-measure-preserving actions of countable non-amenable groups, on Borel and measurable structurability problems, and on hyperfiniteness

problems in descriptive set theory. He has ten publications in high quality research journals.

Congratulations to Catherine Moulder, who was awarded an NSF Graduate Fellowship to support her in her graduate studies in UNT's Department of Chemistry, where she is working toward a Ph.D. in computational chemistry under the direction of Professor Tom Cundari. Catherine did her undergraduate work at UNT, earning Bachelor of Science degrees in both chemistry and mathematics, and she also completed the Mathematics Department's Undergraduate Academic Certificate in the Mathematics of Scientific Computation. As an undergraduate, Catherine was also an active member of the Math Club, and served one year as Math Club Vice President.

Where are they now?

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

Angela Berardinelli (Ph.D. 2015) is an Assistant Professor at Mercyhurst University.

Christopher Caruvana (Ph.D. 2017) is an Adjunct Professor at UNT.

Connie Chan (M.S. 2015) is currently a teacher of AP math courses at Denton High School.

Koshal Dahal (Ph.D. 2015) is an Assistant Professor of Instruction at University of Akron.

Ojas Dave (Ph.D. 2016) is an Assistant Professor at Radford University.

Elizabeth Drellich (Postdoc 2015–2016) is currently visiting faculty at Swarthmore College.

Briana Foster-Greenwood (Ph.D. 2012) is currently tenure-track Assistant Professor at Cal Poly Pomona.

Jared Holshouser (Ph.D. 2017) is an Assistant Professor at University of South Alabama.

Tamara Knox (M.S. 2013) is a Senior Workflow Analyst at Finance of America Holdings.

Jennifer McCluskey (M.S. 2017) is a Data Analyst at Gearbox Software in Addison, Texas.

Philip Puente (Ph.D. 2017) is currently visiting faculty at Dartmouth College.

Drew Tomlin (Ph.D. 2016) is an Instructor at Texas Christian University.

Yujie Yan (Ph.D. 2017) works for the actuarial and consulting firm Lewis & Ellis, Inc.

{ Graduate Student News

Graduate Students Distinguish Themselves



Cory Krause, one of the top graduate students in our department, has accepted a tenure-track position at LeTourneau University, in Longview, TX, starting Fall 2018. His research interests are in logic and functional analysis. Cory uses combinatorial set theory to study the asymptotic geometry of Banach spaces. He received this year's departmental Academic Excellence Award. In his free time he enjoys reading, playing racquetball, and listening to traditional Irish music.



Logan Crone is another top performing graduate student in our department. He distinguishes himself in the Graduate Logic Group, where he frequently presents talks. Logan's research interests are in descriptive set theory and number theory, and he has already submitted two papers for publication. He recently served very effectively on a search committee for a tenure-track position in logic. In his spare time he enjoys walking his dogs, solving math puzzles, and playing extremely challenging PC games, such as FTL: Faster than Light.

Graduate Students Attend International Meetings

Nathaniel Hiers gave a talk at the Frontiers of Selection Principles Conference in Warsaw, Poland, August 2017. It featured his research on game theory, with fellow graduate student Logan Crone and UNT faculty Lior Fishman and Steve Jackson. Jason Atnip and Marco Lopez traveled to Sweden in December 2017 to give talks at the Workshop on Fractals and Dimensions in the Mittag-Leffler Institute near Stockholm.

AMS Sectional Meeting at UNT

The following graduate students gave talks at the AMS Sectional Meeting at UNT on September 9–10, 2017.

Jason Atnip: "Dimensions of meromorphic functions of finite order"

Logan Crone: "Determinacy of Schmidt's game"

Nathaniel Hiers: "The 2-Rothberger game and a generalization of Galvin's theorem"

Janak Joshi: "Existence and nonexistence of solutions for sublinear problems with prescribed number of zeros on exterior domains"

Cory Krause: "Some partial results on the l_p spreading model problem"

Marco Lopez: "Shrinking targets and non-autonomous systems"

Timothy Wilson: "Continuity of Hausdorff dimension in hyperbolic polynomials"

Algebra Symposium

UNT is hosting the regional Algebra Symposium in Spring 2018. This weekend workshop was started at UNT and is organized for and by graduate students each semester. The Algebra Symposium rotates among various universities in Oklahoma and Texas. Previous speakers have hailed from University of Oklahoma, Texas A&M University, Baylor University, University of Texas at Arlington, and other institutions. This year Ph.D. students Chelsea Drescher and Naomi Krawzik from UNT are co-organizers.

Incoming and Outgoing Graduate Students

The department welcomed nine new fully supported graduate students this year.

Fourteen graduate students completed their degree in the past year, six with a Ph.D. and eight with an M.S.

Graduate	Degree	Date	Advisor
Sasan Mohyaddin	M.S.	Summer 2017	Dr. Liu
Heather Wilson	M.S.	Summer 2017	Dr. Brozovic
Philip Puente	Ph.D.	Summer 2017	Dr. Shepler
James Reid	Ph.D.	Summer 2017	Dr. Urbanski
Yujie Yan	Ph.D.	Summer 2017	Dr. Song
Michael Lee	M.S.	Fall 2017	Dr. Quintanilla
Marcie Tiraphatna	M.S.	Fall 2017	Dr. Fishman
Michael Hanson	M.S.	Spring 2018	Dr. Richter
Blake Norman	M.S.	Spring 2018	Dr. Brozovic
Sarah Saeedi	M.S.	Spring 2018	Dr. Song
Jie Zhou	M.S.	Spring 2018	Dr. Song
Nehemiah Kuhns	Ph.D.	Spring 2018	Dr. Conley
Connor O'Dell	Ph.D.	Spring 2018	Dr. Conley
Caleb Ziegler	Ph.D.	Spring 2018	Dr. Gao

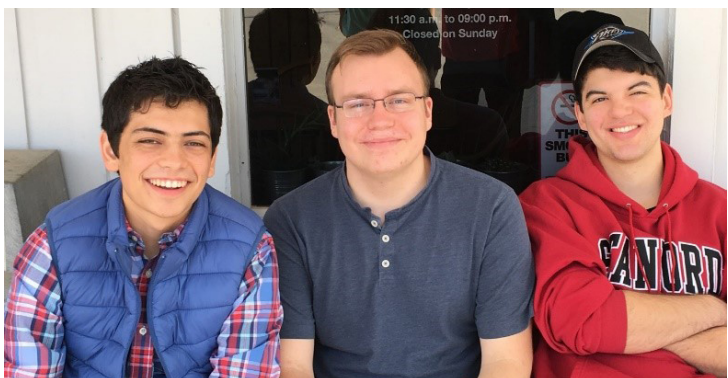
{ Undergraduate News

Math Club

The Math Club, consisting mostly of undergraduate math majors, meets every Friday at 1pm in GAB 473 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. In April 2017, several members of the Math Club participated in the Calculus Bowl at the Texas section of the MAA meeting at Texas A&M Commerce. Our team (Ethan Seal, James Atchley, Tramashika DeWalt, and Zhaochen Gu) made it to the final round. For more information about the math club, go to <http://math.unt.edu/seminars/math-club> or email untmathematicsclub@gmail.com.

Putnam Competition

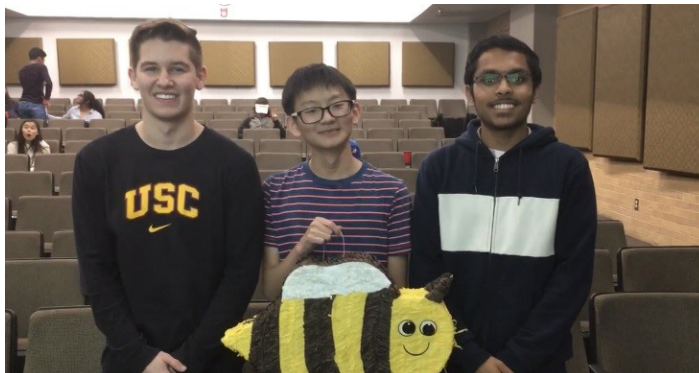
In December 2017 we had three students take the William Lowell Putnam exam. They were: Ethan Seal, Austin MacGregor, and Fernando Moreno. The William Lowell Putnam exam is offered every year on the first Saturday in December to undergraduates. The problems are quite challenging; getting even 1 question correct is an achievement! For the last several years in the fall Dr. Allaart and Dr. Iaia have team taught Math 3010 – a one credit hour problem solving class which helps undergraduates prepare for the Putnam exam.



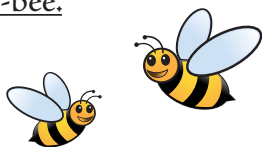
2017 Putnam Exam: From left to right they are: Fernando Moreno, Ethan Seal, and Austin MacGregor.

Integration Bee

The integration bee is a contest for undergraduate and high school students, which tests skills in evaluating indefinite integrals. There's fun, cake, math trivia, and lots of integrals. It takes place each spring, and this year was on March 30. The current organizer of the integration bee is Joseph Iaia. The 2018 Winners were Luis Kim (TAMS, First Place), Payton Ernest (UNT, Second Place), and Pavan Govu (TAMS, Third Place). Prizes are \$75, \$50, and \$25 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>.



From left to right in the photo: Payton Ernest, Luis Kim, and Pavan Govu



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. For more information, go to <http://math.unt.edu/problem-of-the-month>.

Mathematical Modeling Competition

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 2017 two UNT MCM teams participated in the Mathematical Contest in Modeling. Team 1: Zachary Simpson and Jeremy Trammell and Team 2: Fernando Moreno, Benjamin Sivoravong, and Zhanwei Xu. Both teams were recognized as Honorable Mention. This year UNT has one MCM team, consisting of three students: Riya Danait, Fernando Moreno, and Rohan Vijay. Good luck, UNT MCM team!

{ Department Awards

2018 College and Department Awards and Scholarships

Department Faculty Awards

Faculty Research Award:

Dr. Steve Jackson

Faculty Teaching Award:

Dr. Kai-Sheng Song and Dr. Matthew Dulock

Faculty Service Award:

Dr. Olav Richter and Dr. Kiko Kawamura

College Graduate Awards

Outstanding Teaching Fellow/Teaching Assistant Award:

Chelsea Drescher

Department Graduate Awards

Outstanding Teaching Fellow:

Chelsea Drescher

Outstanding Graduate Student:

Jason Atnip

Academic Excellence:

Cory Krause

College Undergraduate Awards and Scholarships

Outstanding Undergraduate Student in Mathematics:

Isaac Bancroft

Outstanding Student in Actuarial Science:

August Sangalli

Outstanding Math Lab Tutor:

Brandon Watson

Aspiring Actuary Scholarship:

Terrence Iwuala

Department Undergraduate Scholarships

E. H. Hanson Scholarship:

Anni Blair

Mildred Masters McCarty Scholarship:

Jack Hasty

David F. Dawson Scholarship:

Terrence Iwuala

Ram Lal Seekri Scholarship:

August Sangalli

John Ed Allen Scholarship:

Isaac Bancroft and Julie Thompson

John W. Neuberger Scholarship:

Richard Caleb Goff

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1155 Union Circle #311430

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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 \$_____ Mildred Masters McCarty Scholarship

\$_____ E. H. Hanson Scholarship \$_____ John W. Neuberger Scholarship

\$_____ The Dan Mauldin Endowment \$_____ Roger L. Perry Scholarship

for Student Excellence \$_____ Ram Lal Seekri Scholarship

I would like to make this donation anonymously.

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. Email your updates to mathchair@unt.edu. We look forward to hearing from you!

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Thank you to our donors!