

SPRING 2019

Chair's Column



Dear Friends and
Members of
UNT Mathematics,

Charles Conley

The big news this year is hiring! This spring we have conducted searches for four new faculty members: a lecturer in developmental mathematics and assistant professors in applied partial differential equations, biostatistics, and data science.

As of press time we have “signed” two new faculty members and are close to signing two more. We are very happy to welcome Jodi Acker as a senior lecturer and Yanyan He as an assistant professor. Jodi joins us from North Lake College and Yanyan joins us from the New Mexico Institute of Mining and Technology.

Two more searches are still underway. One is for our first instructional staff person, who will supervise our undergraduate TAs. And the other is for my replacement! I will be stepping down this fall, and the department is conducting its first external chair search.

As you will read in these pages, during the past year Shirley Cassidy and Kelli Chase

have joined our staff team and the provost has recommended Matt Dulock and Kiko Kawamura for promotion to principal lecturer. Welcome, Kelli and Shirley, and congratulations, Matt and Kiko! And our graduate students have been busy, earning eight Ph.D. and two M.S. degrees. Congratulations also to them!

Around the department, the MathLab has moved to Sage Hall and its old location has been renovated to become our new statistics suite. Just this month we hosted the 10th TORA conference. Finally, I am delighted to announce that Jerome Westheimer has funded a new program in support of undergraduate research.

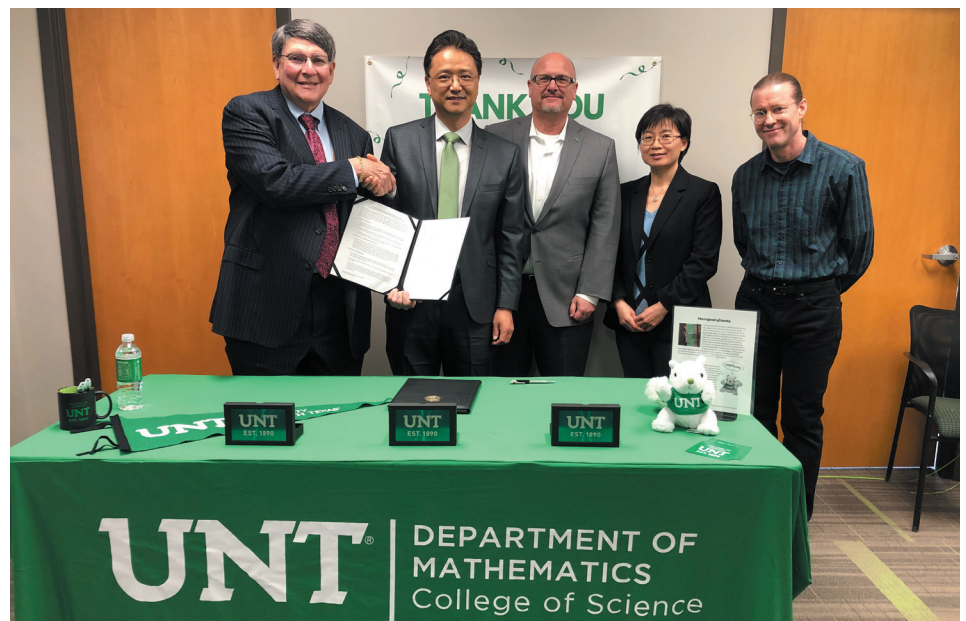
Charles Conley, Chair

{ Table of Contents

Chairs Column	1
Westheimer Science Research Fellows Program	1
Stephen Jackson delivers ICM Address	2
Conference in Honor of Mariusz Urbanski	2
Back-to-School Profile	2
Visiting Faculty	3
“TORA X” Conference	3
Grants	4
Promotions	4
Research by the Numbers	4
New Staff Members	5
Staff Awards	5
Social Media	5
Alumni News	6
Where are they now?	6
Obituaries	6
Graduate Students Distinguish Themselves	7
New Mobile Testing Solution	8
Math Club	8
Putnam Competition	8
Problem of the Month	9
Mathematical Modeling Competition	9
Math Bowl	9
Integration Bee	9
Undergraduate Research	9
2019 College and Department Awards and Scholarships	10
You can Help!	Back Cover

Westheimer Science Research Fellows Program

The department is grateful to UNT Distinguished Alumnus Jerome “Bruzzy” Westheimer, B.A. UNT 1965, for funding the new Westheimer Science Research Fellows program for undergraduate research. The first Westheimer Faculty Fellow will be Dr. Helen Wang, who will mentor four student fellows over the next two years. Her research focuses on using genomes of cancer patients to predict individual reactions to cancer treatments. <https://cos.unt.edu/news> April 3, 2019.



From left to right: Bruzzy Westheimer, Su Gao (Dean of the College of Science), David Wolf (Vice President for Advancement), Helen Wang, Lucky the Albino Squirrel, and Charles Conley

{ Faculty News

Stephen Jackson delivered ICM Address

Stephen Jackson



Steve Jackson, a Regents' Professor and Fellow of the American Mathematical Society, had the great honor to deliver an invited address at the 2018 International Congress of Mathematicians. The title of his talk was "Towards a Theory of Definable Sets". We reprint the abstract here:

The subject of descriptive set theory is traditionally concerned with the theory of definable subsets of Polish spaces. By introducing large cardinal/determinacy axioms, a theory of definable subsets of Polish spaces and their associated ordinals has been developed over the last several decades which extends far up in the definability hierarchy. Recently, much interest has been focused on trying to extend the theory of definable objects to more general types of sets, not necessarily subsets of a Polish space or an ordinal. A large class of these objects are represented by equivalence relations on Polish spaces. Even for some of the simpler of these relations, an interesting combinatorial theory is emerging. We consider both problems of extending further the theory of definable subsets of Polish spaces, and that of determining the structure of these new types of definable sets.

Conference in Honor of Mariusz Urbanski on his 60th Birthday

Mariusz Urbanski



This April the Institute of Mathematics of the Polish Academy of Sciences held a conference on Dynamics, Measures and Dimensions in Bedlewo, Poland, to honor Mariusz Urbanski on the occasion of his 60th birthday. Mariusz completed his Ph.D. at the Nicolaus

Copernicus University. Afterward he spent several years in Göttingen working with Manfred Denker before joining UNT in 1991 to work with Dan Mauldin. Mariusz is a world leader in dynamical systems, with more than 185 research papers and 8 monographs. He has supervised 10 Ph.D. students.

Back-to-School Profile

Krista Hines



Krista Hines, Senior Lecturer and the department's Assistant Chair, was profiled in UNT's 2018 Welcome Back Newsletter for her work on incorporating volunteer tutoring through Communities in Schools in our math course sequence for future elementary school teachers.

Teaching Spotlight on Kiko Kawamura

Journalist: How would you describe your approach to teaching?

Kiko: I believe that mathematics is best learned by active class participation, and I structure my classroom to be an open and welcoming environment where students share their mathematical ideas.

For the whole interview go to: <https://teachingcommons.unt.edu/spotlight/awards/dr-kiko-kawamura>

Visiting Faculty

Arunabha Biswas



Arunabha Biswas joined the department in 2017 as a visiting lecturer. He received his Ph.D. in mathematics from Texas Tech University in 2015 and was a postdoc at Queen's University in Canada. His research interests are in analytic

number theory. In his time at UNT he has specialized in teaching differential equations and multivariable calculus and become known as an accomplished and popular instructor.

Mahmood Etedadi Aliabadi



Mahmood Etedadi Aliabadi joined the department in 2018 on a post-doctoral position in logic under the mentorship of Su Gao. He received his Ph.D. in mathematics from the University of Illinois at Urbana-Champaign in 2017.

Jianjun Zhang



Jianjun Zhang joined the department in 2017 on a postdoctoral position in biostatistics, working with Helen Wang. He received his Ph.D. in statistics from East China Normal University in 2017.

Conferences



This April the department hosted "TORA X", the 10th Texas-Oklahoma Representation Theory and Automorphic Forms conference. There were 60 participants, coming from England, Japan, Sweden, Switzerland, and the US. The plenary speakers were Ozlem Imamoglu (ETH Zurich) and David Vogan (MIT), and the junior plenary speaker was Olivia Beckwith (University of Bristol). TORA is an NSF-funded conference series rotating between Oklahoma State University, the University of Oklahoma, and UNT.

<http://www.math.unt.edu/~richter/TORA/TORA10.html>

Grants

Several faculty members were awarded grants this year:

- Rajeev Azad received an award from the National Institute of Health for his project Zebrafish Thrombopoiesis.
- Nam Trang was awarded a grant by the National Science Foundation to fund his project Descriptive Inner Model Theory and its Applications.
- Mariusz Urbanski was funded by the Simons Foundations for his project Random and Conformal Dynamical Systems.

And Helen Wang is part of a team that has been awarded several major grants to study adverse outcomes of pediatric cancer treatments, such as therapy-related cardiac disease and malignant neoplasms. Helen works in statistical genetics, and one of the primary objectives of her research is to develop methods to identify genetic variants influencing susceptibility to complex diseases.

<https://cos.unt.edu/news/dr-xuexia-wang-awarded-major-grant-support-childhood-cancer-research>

Promotions

Matt Dulock and Kiko Kawamura have been recommended by the provost for promotion to principal lecturer. Congratulations to both of them!

{ Number Facts

2019 Research by the Numbers

- 35 faculty members: 11 lecturers and 24 professors
- 4 research grants from the Simons Foundation
- 3 research grants from the National Science Foundation
- 2 research grants from the National Institutes of Health
- 10 countries where faculty members gave invited research talks: Brazil, Canada, China, France, Italy, Netherlands, Spain, Sweden, Switzerland, and the United Kingdom
- 3 postdocs
- 2 conferences hosted by the department
- 16 research journals where faculty members served on the editorial board

{ Department News

New Staff Members



Kelli Chase joined the department in July 2018 to staff the front desk and manage the Math Quest Center. She comes to us from the University of Georgia, where she was the assistant to the Associate Dean of the College of Veterinary Medicine. She is married with five adult children and two grandchildren, all living here in Denton.



Shirley Cassidy joined the department this February as our Grants and Travel Coordinator. In the past she has taught elementary school and worked for the US Census Bureau, but her primary career has been in higher education. She worked in Admissions at Guilford College in North Carolina, and then at UT Dallas as secretary for the Dean of the School of Human Development and later for the Dean of the School of Engineering and Computer Science. She holds a Bachelor's degree in music from UT El Paso.

Staff Award

This spring Maegan Garcia received the UNT Star Performer Award and was nominated for the UNT Rising Star Award. Maegan has worked for the Mathematics Department since 2017 and has been our Graduate Program Coordinator since March 2018.

Congratulations to Jana Watkins, who was nominated for the Steve Miller Outstanding Employee Award in March 2019. Jana has been employed with UNT since 2007 and joined our department in July 2011.

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

La Keisha Leonard



La Keisha Leonard, who holds a B.S. in mathematics from UNT and an M.E. from UT Arlington, will be a Master Teacher with UNT's Teach North Texas program beginning this fall. Prior to joining TNT, Ms.

Leonard taught at the STEM academy METSA at the R.L. Turner High School in Carrollton.

Kimberly Muller



Kimberly Muller, Ph.D. Mathematics UNT 2004, became dean of the College of Innovation and Solutions at Lake Superior State University this past December. The college is comprised of the School of Engineering & Technology, the School of Mathematics & Computer Science, and the

School of Business. Dr. Muller received her Ph.D. under Paul Lewis and has been at LSSU since then.

Where are they now?

Our alumni live and work all over the world. Here are some updates:

- Cory Crause (Ph.D. 2019) is an assistant professor at Le Tourneau University in Longview, Texas
- Drew Allen (Ph.D. 2018) is an adjunct instructor at UNT
- Marc Foster (M.S. 2018) is an adjunct at West Coast University in Dallas
- Marco Lopez (Ph.D. 2018) is a postdoc at Wake Forrest University in Winston-Salem, North Carolina
- Janak Joshi (Ph.D. 2018) is an assistant professor at Cameron University in Lawton, Oklahoma
- Jason Atnip (Ph.D. 2018) is a postdoc at the University of New South Wales in Sydney, Australia
- Connor O'Dell (Ph.D. 2018) is an assistant professor at Northeastern State University in Tahlequah, Oklahoma
- Nehemiah Kuhns (Ph.D. 2018) is a software engineer at L3 ComCept in Rockwell, Texas
- Michael Hanson (M.S. 2018) is a Ph.D. student at the University of Tennessee in Knoxville
- Michael Lee (M.S. 2017) is a high school teacher in Decatur, Texas
- Marcie Tiraphatna (M.S. 2017) is a Ph.D. student at Virginia Tech
- Heather Wilson (M.S. 2017) is a high school teacher in Fort Worth
- James Reid (Ph.D. 2017) is an assistant professor at Centenary College in Shreveport, Louisiana
- Cristian Allen (Ph.D. 2017) is an assistant professor at Wartburg College in Waverly, Iowa

Obituaries

Karen Brucks, Ph.D. Mathematics UNT 1988, passed away in 2017. She wrote her dissertation under Dan Mauldin and had a distinguished career at the University of Wisconsin-Milwaukee, where she served as Chair of the Department of Mathematical Sciences as well as Associate Dean of Natural Sciences in the College of Letters and Science. <https://uwm.edu/academicaffairs/sad-news-2017-july-brucks/>

{ Graduate Student News

This year the department welcomed 11 new fully supported graduate students. We also saw 10 students complete their degrees: Congratulations to all of them!

Drew Allen: Ph.D. December 2018; Advisor: P. Allaart

A random walk version of Robbins' problem

Jason Atnip: Ph.D. August 2018; Advisor: M. Urbanski

Conformal and stochastic non-autonomous dynamical systems

Bobby Barnes: M.S. May 2019; Advisor: N. Anghel

Protein modeling via Clifford algebras

Michael Cotton: Ph.D. May 2019; Advisor: S. Gao

Abelian group actions and hypersmooth equivalence relations

Marc Foster: M.S. December 2018; Advisor: N. Anghel

Transitioning from synthetic to analytic geometry

Nathaniel Hiers: Ph.D. May 2019; Advisors: L. Fishman and S. Jackson

Equivalence of the Rothberger and k -Rothberger games for Hausdorff spaces

Janak Joshi: Ph.D. August 2018; Advisor: J. Iaiá

Existence and nonexistence of solutions for semilinear problems on exterior domains

Tyler Kenefake: Ph.D. May 2019; Advisor: C. Conley

Annihilators of bounded indecomposable modules of $\text{Vec}(\mathbb{R})$

Cory Krause: Ph.D. May 2019; Advisor: B. Sari

Infinitary combinatorics and the spreading models of Banach spaces

Marco Lopez: Ph.D. August 2018; Advisor: M. Urbanski

Hausdorff dimension of shrinking-target sets under non-autonomous systems

Abstracts may be found at: <https://math.unt.edu/seminars/thesis-and-dissertation-defense>

{ Undergraduate News

College of Science Implements New Mobile Testing Solution



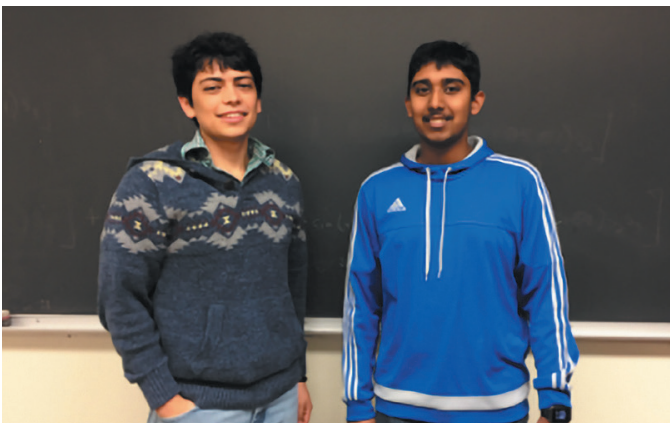
The College of Science recently purchased 120 MacBooks and 500 iPads to enable mobile administration of computer-based exams. The MacBooks were used for the first time this February for exams in Math 1680, Elementary Probability and Statistics, and the iPads have been used by the political science department. Additional power outlets in Curry 103 will allow expansion of their use starting in Fall 2019.

Math Club

The Math Club is devoted to promoting interest in mathematics and fellowship among students of all mathematical backgrounds. Meetings are at 2:00 in GAB 473. Topics vary from preparing for the Putnam exam to planning department picnics at North Lakes Park. Picnic activities often include soccer, ultimate frisbee, croquet, and hacky sack. And of course, BBQ! <http://math.unt.edu/seminars/math-club>, untmathematicsclub@gmail.com.



Putnam Competition



Fernando Moreno (left) and Rhythm Garg (right)

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.

were Luis Kim, Payton Ernest, and Pavan Govu.

<http://math.unt.edu/integration-bee>.

Problem of the Month

Each month the math club holds a "problem of the month" competition for undergraduates. Correct solutions earn cash prizes and certificates of excellence. Recent winners and runners up include Rhythm Garg (with an impressive 5 wins!), Fernando Moreno, Trenton Hicks, and Tien Le. Here is a recent problem – see if you can get it!

Consider a square $ABCD$ with vertices labeled counterclockwise and with vertex A in the upper-left corner. There are three segments - one from corner A , one from corner B , and one from corner C . The segments intersect at a point P in the interior of the square and P lies below the diagonal AC . The length of the segment PA is 1, the length of the segment PB is 2, and the length of the segment PC is 3. Determine angle APB .

<http://math.unt.edu/problem-of-the-month>.

Mathematical Modeling Competition

Each year a team from UNT competes in the Mathematical Contest in Modeling (MCM), an international contest for high school and college students organized by the Consortium for Mathematics and Its Applications (COMAP). Our 2018 team received honorable mention and included Riya Danait, Fernando Moreno, and Rohan Vijay, with coaching by Dr. Jay Liu. This year's team is Jack Hasty, Arun Surujpaul, and Blake Woodson. Good luck to them!

<https://www.comap.com/undergraduate/contests/>

Integration Bee

The integration bee is a contest to evaluate indefinite integrals. There's fun, cake, math trivia, cash prizes, and lots of integrals. It takes place every April under the supervision of Dr. Joe Iaia. The 2018 winners



Math Bowl

This March one intrepid UNT student, Fernando Moreno (pictured below), made the trek to the 2019 meeting of the Texas Section of the Mathematical Association of America at Tarleton State University



to compete in the Math Bowl. He made it through to the final round. Great job Fernando! Next year's meeting will be at UNT, and the students are greatly looking forward to a bowl at home.

Undergraduate Research

TAMS student Julia Camacho has been working under Dr. Helen Wang to explore new ways to apply computational biology and statistics to cancer research. Julia created a computer program which uses data from survivors of childhood cancer to predict the possibility of secondary nervous system cancer in adulthood. Her project won first place in the 2019 Fort Worth Regional Science and Engineering Fair Computer Science Division and



TAMS student Julia Camacho explains her project to Dr. Conley at the 2019 UNT Women in STEM Symposium while her mentor, Dr. Wang, looks on.

{ Department Awards

2019 Mathematics Department Awards and Scholarships

Faculty Awards

Faculty Research Award:
Faculty Teaching Awards:
Faculty Service Awards:

John Krueger
Stephen Jackson and Kiko Kawamura
Krista Hines and Joe Iaia

Graduate Awards and Scholarships

Outstanding Graduate Student:
Academic Excellence Award:
Outstanding Teaching Fellow:

Naomi Krawzik
Logan Crone
Tyler Kenefake

John Ed Allen Scholarship:
Dan Mauldin Scholarship:
John Neuberger Scholarship:

Chelsea Drescher
Justin Swain
Isaac Bancroft

Undergraduate Awards and Scholarships

Outstanding Undergraduate Student:
Outstanding Student in Actuarial Science:
Outstanding Math Lab Tutor:

Alan Hankins
Heather Valenta
Ethan Seal

Dawson Scholarship:
Hanson Scholarship:
McCarthy Scholarship:
Perry Scholarship:
Seekri Scholarship:

Isaac Echols
Don Do
Gloria Echun
Alan Hankins
Tyra Koski

{ 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



Please mail contribution to:

University of North Texas
Department of Mathematics
1155 Union Circle #311430

Card Number

Exp. Date

Signature

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!

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!