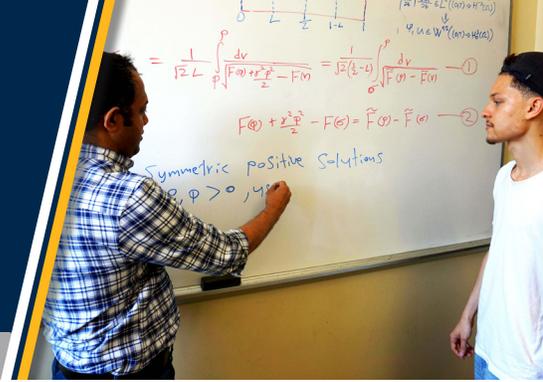




MATHEMATICS AND STATISTICS NEWSLETTER

Fall 2021



A MESSAGE FROM THE DEPARTMENT HEAD



I am grateful to faculty, staff, and students for coming together in the face of extreme disruptions caused by the Covid pandemic. Everyone deserves a very big "Thank You."

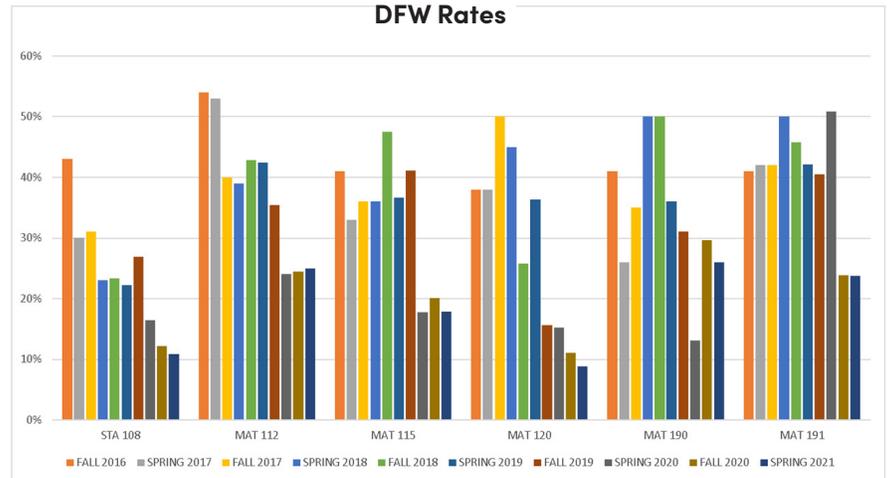
Each fall and spring, I have the pleasure of sharing with you some exciting highlights about our department. The Fall newsletter showcases departmental highlights for the period January 1 – July 31. The spring newsletter provides information for the previous Calendar Year. This newsletter covers the period January 1, 2021 to July 31, 2021.

Spring 2021 turned out to be a remarkable semester for us on many fronts. We received a record number of external grants (6), graduated 3 more PhD students, and the faculty had 34 new high-quality journal articles published/accepted on top of 46 articles published in CY 2020. The faculty made 20 research presentations as well.

Two of the faculty received special professional recognitions. Sat Gupta became an elected member of the International Statistical Institute. Beth Lewis won the UNCG Online Teaching Excellence Award.

I invite you to browse this newsletter to learn more about the exciting developments in the department since January 1, 2021.

Dr. Sat Gupta
Fellow of the American Statistical Institute



STUDENT SUCCESS IN LOWER-LEVEL COURSES GROWS

Our efforts over the past two years to improve student success in entry-level courses have started to payoff. We have introduced a Graduate Instructional training program to better prepare our graduate teaching assistants to teach classes. We have also introduced a totally revamped Calculus Readiness and Diagnostic Test that allows students to remediate themselves and then properly place in lower courses. Also, our lower-level courses are now highly coordinated. As a result, our DFW (students who received a "D," "F," or withdrew) rates have improved dramatically.

Not only have our DFW rates improved, but far greater number of students are now attempting our gateway courses. For example, we grew from 531 attempts in Calc I in 2019-2020 to 766 in 2020-2021.

CELEBRATION OF GRADUATES

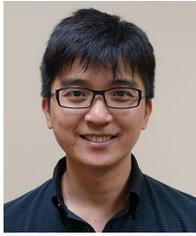
A virtual celebration was held on May 7, 2021 to congratulate the December 2020 and May 2021 graduates. Students were recognized through a Zoom presentation attended by faculty, staff, fellow students, and family members. PhD student Badr Aloraini and undergraduate student Juan Quiroa (right) shared their experiences as students of UNCG. View their videos on the [College of Arts & Sciences' YouTube channel here.](#)



FACULTY NEWS



Tracey Howell
(2012 -21)



Yu-Min Chung
(2018-21)



Beth Lewis
(2018-21)

A GOODBYE TO OUR DEPARTING FACULTY

Three of our colleagues decided not to return this year. Tracey Howell and Yu-Min Chung were able to secure bigger positions in the academy/industry. We were sad to say “goodbye” to them but are excited to see them excel in their new positions. Tracey Howell (senior academic professional) moved to a tenure-track position at Appalachian State University, and Yu-Min Chung (assistant professor) moved to Eli Lilly. Beth Lewis decided not to return for personal reasons.



Sheela Misra



Alexey Sukhinin



Maxine Guzman

WELCOMING THREE NEW FIXED-TERM FACULTY

We also made some faculty hires for a one-year term. Dr. Sheela Misra has joined the department as a visiting professor of statistics. She is an elected member of the International Statistical Institute. Dr. Alexey Sukhinin has joined us as a visiting assistant professor (Mathematics) after extensive postdoc work at North Dakota State University, Vermont, and SMU. Dr. Maxine Guzman has joined us as a lecturer after serving as director of QUEST at Salem College.

FACULTY RECOGNITION



Dr. Sat Gupta became an elected member of the International Statistical Institute.



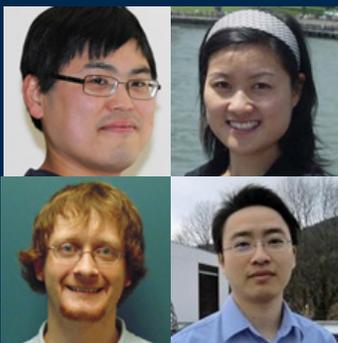
Dr. Dan Yasaki was appointed as the director of Student Success.



Dr. Elizabeth Lewis received the 2020 UNCG Award for Excellence in Online Education.



Mr. Matthew Jester was appointed director of the Math Help Center and the Math Emporium Lab.



EXTERNAL GRANT SUCCESS

Continuing with the unprecedented success with external grants in 2019-20, faculty secured a record number of grants again in spring 2021. *Clockwise from top-left:* **Dan Yasaki** secured a Simons Foundation grant (2021-26, \$42,000); **Xiaoli Gao** secured a Simons Foundation grant (2021-26, \$42,000) and an Army Research Office grant (2021-22, \$158,000); **Tom Lewis** secured an NSF grant as PI (2021-24, \$119,972) and another NSF grant as Co-PI (2021-24, \$114,944); and **Yi Zhang** secured an NSF grant as PI (2021-24, \$114,944), a Simons Foundation grant (2021-26, \$42,000), and another NSF grant as PI (2021-22, \$12,500).

STUDENT NEWS



PHD STUDENTS FIND SUCCESS

On top of the five PhD students we graduated last year, we graduated three more this year. *Pictured above, from left to right: Romesh Thanuja* (Advisor Haimeng Zhang) received an assistant professor position in Sri Lanka (his native country); **Amila Muthunayake** (Advisor Shivaji) received a postdoc position at University of Miami; and **Badr Aloraini** (Advisor Sat Gupta) accepted a one-year instructor position at NCA&T State University.

Newly Recruited Graduate Students: In spite of budgetary constraints, we were successful in recruiting a strong group of new graduate students, including eight new PhD students and four new master's students.

SUMMER SCHOOL IN COMPUTATIONAL NUMBER THEORY AND ALGEBRA



Clifford Smyth organized the NSF-funded (PI-Brett Tangedal), "UNCG Summer School in Computational Number Theory and Algebra: Applications of Expander Graphs to Number Theory and Computer Science" from May 24-28, 2021. The school was run entirely online, allowing 25-30 students from all over the world to receive a valuable learning experience in

the midst of the pandemic. Speakers included Irit Dinur of the Weizman Institute of Science and 2019 Godel prize winner, Alex Kontorovich of Rutgers University. Learn more at go.uncg.edu/expanders.

THANK YOU TO OUR DONORS

Thanks to several generous gifts from our alumni and other donors, many undergraduate and graduate students received a variety of awards and scholarships such as the Helen Barton Scholarship, Lone Holt Grogan Scholarship, Vicky Langley Math Scholarship, Judith J. Mendenhall Scholarship, Mary D. Murray Scholarship in Mathematics, Eldon E. and Christine J. Posey Mathematics Scholarship, Cornelia Strong Scholarship, Cornelia Strong Scholarship, Bertha Barnwell Vielhauer Endowed Scholarship, Dr. Theresa Phillips Vaughan Math Scholarship, and the newly established Adams, Culbreth and Nunn Endowed Scholarship.

RESEARCH SPOTLIGHT

Dr. Yi Zhang joined the department in 2017 as an assistant professor. He earned a PhD in 2013 from Louisiana State University. He held postdoc positions at University of Tennessee and University of Notre Dame before joining UNCG.



Dr. Zhang's research areas are in computational mathematics and numerical analysis. His main focus is numerical solutions to deterministic and stochastic partial differential equations (PDEs). He has worked on developing, analyzing, and computer implementation of numerical approximations for variational inequalities, PDE-constrained optimization problems, and stochastic phase field models. These problems arise in numerous applications ranging from materials science, mechanical engineering, control, biology, to economics and finance.

Dr. Zhang received a Center for Undergraduate Research in Mathematics (CURM) grant (2021-22, \$12,500) for the project, "Studying material transport in the vortical flow using Direct Numerical Simulations: Lagrangian and Eulerian approaches." The project focuses on methods of computational mathematics and their applications in fluid dynamics, providing education and research training for STEM undergraduate students.

Dr. Zhang also received a collaboration grant entitled "Robust Numerical Methods for PDE-Constrained Optimization with Uncertainty" from Simons Foundation (2021-26, \$42,000), and a three-year (2021-24, \$ 114,944) NSF grant entitled, "Novel Discontinuous Galerkin Methods for Deterministic and Stochastic Optimization Problems with Inequality Constraints." The intellectual focus of the projects will be on designing novel numerical methods for variational inequalities and PDE-constrained optimizations. The projects will provide insights on the understanding of complicated physical models with singular and random perturbations. This level of success with external grants in mathematics so early in one's career is very rare.

More information about Dr. Zhang can be found at https://www.uncg.edu/~y_zhang7/index.html

RESEARCH SPOTLIGHT

Dr. Dan Yasaki joined UNCG in 2008 as an assistant professor following a three-year postdoc at UMass Amherst. He earned his PhD from Duke University in 2005. Yasaki is an active member of the Number Theory research group at UNCG, helping organize the annual NSF and NSA funded UNCG Summer School in Computational Number Theory since 2012. Yasaki just received a five-year (2021-26) Simons Foundation collaboration grant.



Yasaki's research focuses on arithmetic quotients of symmetric spaces. These locally symmetric spaces stand at the intersection of various topics in number theory, geometry, and topology. These spaces can be used to reveal arithmetic properties of automorphic forms. The Langlands philosophy asserts that there should be a deep connection between modular forms, or more generally automorphic forms, and arithmetic. Yasaki's research is concerned with this more general setting.

Yasaki served as a Task Force member of the UNC System Math Pathways Project, a system-wide initiative to tackle the various issues that may inhibit student success in mathematics. Working with representatives from all of the UNC System schools, the Task Force developed a list of recommendations that was adopted by the Chief Academic Officers from each of the UNC System schools in Fall 2019. He serves as a member of the Math Pathways for African American Collegiate Transformation (MPAACT) team, which builds on the Pathways recommendations to identify and address the unique barriers to success for African American men. In recognition of his contributions toward the Math Pathways project and towards overall student success, Yasaki has been appointed as the department's director of Student Success.

More information can be found at <https://mathstats.uncg.edu/yasaki/>



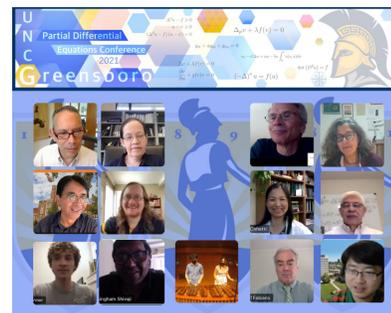
2021 REU IN COMPUTATIONAL STATISTICS

Undergraduate research has been a major strength for our department for more than 15 years. We have hosted many NSF-funded research programs over the years, the latest being the REU program in Complex Data Analysis using Statistical and Machine Learning Tools [Sat Gupta (PI) and Xiaoli Gao (Co-PI)] that ran from May 26 – July 31, 2020, and again, from May 24–July 30, 2021.

Each summer, the program trains nine nationally recruited undergraduate students who work on a variety of research projects. This year's students completed impressive research and made final presentations to the department faculty and graduate students on July 29, 2021.

NEW PDE CONFERENCE

This year the department added another biennial international conference, "The UNCG Partial Differential Equations (PDE) Conference" that was hosted virtually during May 24–25, 2021, led by R. Shivaji, Rich Fabiano, Maya Chhetri, Tom Lewis, and Yi Zhang. The primary objective of this conference series is to provide a forum for researchers from academia, industry, and laboratories worldwide to share results on all aspects of recent advances in partial differential equations. The inaugural 2021 conference featured six plenary lectures by world-renowned experts and 10 parallel contributed talk sessions.



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