MATHEMATICS AND STATISTICS

NEWSLETTER

Spring 2022

A MESSAGE FROM THE DEPARTMENT HEAD

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 December 31, 2021.

First of all, a big "thank you" to the faculty, students, and staff for coming together in the face of Covid challenges. Although these challenges are not over, we have started to see light at the end of the tunnel.

AY 2021 turned out to be a remarkable year for us in many ways. We got a record number of major multi-year external grants (7) as PI-Co-PI on top of the four (4) multi-year grants we received last year. The number of grant recipients over the last two years alone is now nine (9). We graduated 4 more PhD students, and the faculty had 45 high-quality journal articles published/accepted on top of 57 journal articles we had in CY 2020. The faculty made 57 research presentations in spite of the Covid disruptions. The department hosted 82 colloquium/seminar talks.

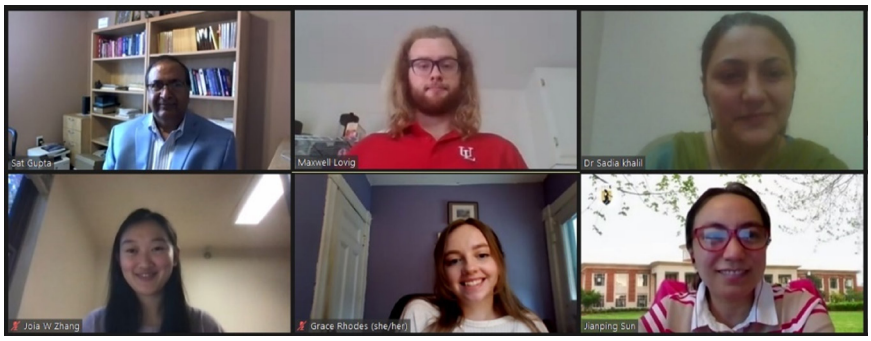
Two of the faculty received special professional recognitions. Sat Gupta became an Elected Member of the International Statistical Institute. Beth Lewis won the UNCG Online Teaching Excellence Award.

The faculty was much relieved with the proposed move to Moore Building being postponed at least for the time being. This move was a major distraction for much of the faculty.

I invite you to browse this newsletter to learn more about the various exciting things that have happened in the Department since January 1, 2021.

Sincerely,
Sat Gupta
Fellow of the American Statistical Association

AISC 2021 CONFERENCE



Best Student Presentation Award Recipients and Mentors
From top left to right: Sat Gupta, Maxwell Lovig, Sadia Khalil, Joia Zhang, Grace Rhodes, and Jianping Sun

We successfully hosted (virtually) the 7th edition of our long standing biennial AISC conference series—International Conference on Advances in Interdisciplinary Statistics and Combinatorics, during October 8–10, 2021. Conference details are available at https://sites.google.com/uncg.edu/aisc2021

The conference featured 154 talks including 9 plenary talks. Karen Kafadar, Commonwealth Professor and Chair of the Department of Statistics at the University of Virginia was the keynote speaker. Karen was the ASA President for 2019. The conference featured 33 parallel sessions, some of which were organized and chaired by our own faculty (Xiaoli Gao, Scott Richter, John Stufken, Jianping Sun, Thomas Weighill, and Haimeng Zhang). Susan Letvak and Thomas McCoy from our School of Nursing organized a session on "Statistics for Nursing and Health Sciences Research".

Three students from the UNCG 2021 Summer REU program won top awards in the undergraduate research presentation category. Joia Zhang (University of Washington) and Nathaniel Mersy (St Olaf College) won the top award for their joint presentation "Mitigating Lack of Trust in Quantitative Randomized Response Techniques Models". Joia and Nathaniel were mentored by Sat Gupta and his former PhD student Sadia Khalil from Lahore College for Women University. Grace Rhodes (Mount Holyoke College) won the 3rd place award for her presentation "Markov Chain Composite Likelihood and Its Application in Recombination Model". Grace was mentored by Jianping Sun.

External sponsors for the conference included Institute for Mathematics and its Applications (IMA), National Institute of Statistical Sciences (NISS), McGraw Hill, and Springer.

RESEARCH SPOTLIGHT

Dr. Talia Fernós joined UNCG in 2010 as an assistant professor following several postdoctoral positions, most notably a 2006 National Science Foundation (NSF) Mathematical Sciences Postdoctoral Research Fellowship that was served at UCLA and at the Hebrew University of Jerusalem. Dr. Fernós earned their PhD from the University of Illinois, Chicago in 2006.

Fernós' research focuses broadly on the study of infinite groups through a geometric and analytic lens. For example, by studying the interplay between geometry of (finite dimensional) CAT(0) cube complexes, and the dynamics of the Furstenberg-Poisson boundary, Fernós with collaborators Lécureux and Mathéus proved the bountiful existence of regular elements whenever the acting group is non- elementary, a necessary condition.

Fernós feels honored to have their research recognized by the NSF, most recently by being awarded a standard research grant for $283,145. This sole PI-grant includes 3 years of full support for PhD student Jennifer Beck, the first of its kind for the Department of Mathematics and Statistics.

Fernós is quite active in (co-)organizing events for people to network and learn. Such organizational activities range from departmental social gatherings to international workshops and conferences. For example, this fall Fernós organized an event for Spanish speakers from the department to get together and practice Spanish. Similarly, in February 2020, Fernós co-organized the Young Geometric Group Theory Workshop in Saint-Jacut-de-la-Mer, attended by over 100 young researchers from 16 different countries. To support the travel from US-based participants, Fernós applied for and received a conference grant from the NSF for $46,793.

Fernós also enjoys hiking with their two dogs, yoga, acroyoga, slacklining, and practicing Spanish and French with other members of the local linguistic communities.

More information can be found at https://mathstats.uncg.edu/t_fernos/

THE 17th UNCG RMSC 2021

The Department has hosted the UNCG Regional Mathematics and Statistics Conference, a one-day student conference every year since 2005. The 17th edition of the conference took place on Saturday, November 20, 2021. The main focus of this conference is on promoting student research in mathematics, statistics, and related fields. This student-focused conference features research presentations by undergraduate and graduate students. We also offer a plenary lecture by a distinguished scientist and professional development activities for students. This year, the conference took place virtually.The plenary lecture was delivered by Dr. Benjamin Allen, Emmanuel College. Lead organizer for the conference was Dr. Igor Erovenko

PDE CONFERENCE

For many years, the Department has been hosting an annual student conference – The UNCG RegionaL Mathematics and Statistics Conference (RMSC), and a biennial international conference on Advances in Interdisciplinary Statistics and Combinatorics (AISC). This year we added another biennial international conference "The UNCG 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 6 plenary lectures by world renowned experts (Douglas Arnold, Alfonso Castro, Mónica Clapp, Xiaobing Feng, Peter Polácik, Beatrice Rivière), and 10 parallel contributed talk sessions with 47 presentations. There were 195 registered participants from 24 countries, including 23 recent PhD (within three years) recipients and 56 graduate students.

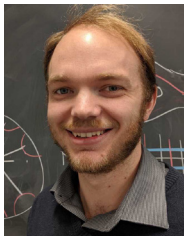
2021 REU IN COMPUTATIONAL STATISTICS

Keeping up with the long tradition of NSF-funded REU programs, we hosted a 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 in the Summer of 2020, and again, from May 24–July 30 in the Summer of 2021. Each summer, the program trains nine nationally recruited undergraduate students who work on a variety of research projects. In addition to Sat Gupta (PI) an Xiaoli Gao (Co-PI), there were 4 other faculty (Scott Richter, John Stufken, Jianping Sun, and Thomas Weighill) who served as Senior Personnel. Rakhi Singh (a postdoc in the Graduate School) also served as a mentor.

FACULTY NEWS







From left to right: Sat Gupta, Elizabeth Lewis, Greg Bell, Dan Yasaki, Thomas Weighill, Cliff Smyth, Matt Jester

INTERNAL AND EXTERNAL FACULTY RECOGNITION

Dr. Sat Gupta became an Elected Member of the International Statistical Institute. Dr. Elizabeth Lewis received the 2020 UNCG Award for Excellence in Online Education. Dr. Greg Bell was appointed Interim Dean of the UNCG Graduate School.

Dr. Dan Yasaki was appointed as the Director of Student Success. Dr. Thomas Weighill received a UNCG New Faculty grant for January 2022–June 2023, Dr. Cliff Smyth was approved for a Research Assignment for Fall 2022, and Mr. Matthew Jester was appointed Director of the Math Help Center and the Math Emporium Lab

WELCOMING NEW FACULTY

Three of our colleagues left us in summer 2021 to explore other options but we welcomed three Professional Track faculty for 2021–22. These included Dr. Sheela Misra who joined the Department as a Visiting Professor of Statistics. Dr. Misra comes from University of Lucknow where she was a Professor of Statistics and Statistics Department Head for many years. Dr. Alexey Sukhinin joined us as a Visiting Assistant Professor (Mathematics) after extensive postdoc work at North Dakota State University, Vermont, and SMU. Dr. Maxine Guzman joined us as a Lecturer after serving as Director of QUEST at Salem College.





EXTERNAL GRANT SUCCESS

The Department has had tremendous success with external grants over the past two years. In 2019-20, the Department had received 3 major NSF awards (Sat Gupta, Talia Fernos, and R. Shivaji) and one Army Research Office grant (Yu-Min Chung) totaling over a million dollars. The faculty secured a record number of grants again in Spring 2021. 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). Scott Richter is Co-PI on a NICHD $1,383,566, 3-year grant with Maryanne Perrin from the Nutrition Department serving as the PI.

RESEARCH SPOTLIGHT

Dr. Sat Gupta joined the Department in 2004 as a tenured professor and currently serves as Department Head. He is a Fellow of the American Statistical Association and the winner of the University-Wide Senior Research Excellence Award (2017) and the CAS Senior Teaching Excellence Award (2018). He has won numerous other awards and serves as the Editor-in-Chief of the Journal of Statistical Theory and Practice published by Springer (http://www.tandfonline.com/loi/UJSP20).

Gupta's research focuses on Randomized Response Technique (RRT) models. RRT is an important survey technique when researchers try to collect information on sensitive topics such as drug use and sexual behaviors etc. where there is a greater risk of response bias. RRT models allow respondents to provide a noise-added response in order to preserve their privacy. This noise can later be filtered out at an aggregate level but not at individual level. In a 2002 paper that appeared in the Journal of Statistical Planning and Inference, and which has already received 175 citations, Gupta introduced the class of **Optional RRT Models** where the respondents are allowed to provide a noise-free response if they find the research question as non-sensitive. Through a series of strong journal articles, Gupta and his collaborators have shown that Optional RRT models are far more efficient that their non-optional counterparts.

Another significant contribution made by Gupta is introduction of a **Unified Measure of Efficiency and Privacy** for RRT models. Often efficiency and privacy are studied separately. In a recent 2021 paper that appeared in Communications in Statistics—Simulation and Computation, Gupta introduced a technique to deal with the **lack of trust** in RRT models. Many of these innovative concepts are covered in his 150+ journal articles. Gupta is the recipient as PI and Co-PI of many external grants including the currently ongoing NSF REU grant as PI (2020–22, $324,000). Gupta has also provided statistical consulting to numerous campus and off-campus clients and has testified as expert witness in many court cases.

More information about Dr. Gupta can be found at https://sites.google.com/uncg.edu/sat-gupta/

STUDENT NEWS




PHD STUDENTS FIND SUCCESS

In addition to the five (5) PhD students we graduated last year, we graduated four (4) three more this year. Pictured above, from left to right; Romesh Thanuja (Advisor Haimeng Zhang) got an Assistant Professor position in Sri Lanka (his native country). Amila Muthunayake (Advisor Shivaji) got a postdoc position at University of Miami, Badr Aloraini (Advisor Sat Gupta) accepted a one-year instructor position at NCA&T State University, and James Rudzinski (Advisor Cliff Smyth) is working as a Lecturer in our department for now.

Newly Recruited Graduate Students: In spite of the budgetary constraints, we were successful in recruiting a strong group of new graduate students. We recruited 8 new PhD students and 4 new Master's students. Our total PhD enrollment now stands at 30.

VIBRANT COLLOQUIUM SERIES IN THE DEPARTMENT

An unexpected positive to come out of the Covid pandemic was that we were able to host many top researchers from outside of UNCG to add to our in-house speakers. In CY 2021, we featured 82 colloquium/seminar talks. These included 23 colloquium talks, 6 Helen Barton Lectures in Computational Mathematics, 23 seminars in Pure Mathematics, 17 seminars in Applied mathematics and 13 seminars in Statistics. These 82 talks were the largest ever in the department in a calendar year.

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