

STORies

FALL 2021 **NEWSLETTER**

Department of Statistics and Operations Research



THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL

STORIES

FALL 2021

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Editorial Team:
Nicolas Fraiman
Zhengwu Zhang



Dear Friends,

Welcome to the 2021 annual issue of STORies, which looks back at the department's past academic year 2020/2021 and considers its outlook.

Starting with the elephant in the room, the COVID-19 pandemic presented many challenges over the academic year 2020/2021, from maintaining the department's educational and other missions mostly remotely to dealing with financial shortfalls at the university level and most sadly to personal losses in the extended families of our faculty, staff and students. There is some consolation in the fact that we all have been confronting this together.

There is also optimism in that vaccines will allow a return to some form of normal soon. In fact, the university is starting the new academic year 2021/2022 with in-person classes even during another surge in COVID-19 cases. It is still to be seen whether the very high vaccination rates in the university community will allow to continue with this in-person experience that is foremost important to our students, but also their parents, faculty, staff and others.

The pandemic aside, there have been several exciting developments in the department over the past year. We have moved towards improving engagement with donors and alumni and revamping the department's projected image. This is exemplified by our new website stor.unc.edu. Its launch required huge efforts from several dedicated faculty and contributions from the rest of the department's community. We expect the webpage to continue improving and certainly reflect the latest departmental activities.

We have continued pushing into the data science/analytics domain. Efforts have been ongoing to expand data science activities at the university level, with the department aiming to play a central role. More tangibly, the department and other partners launched a data science minor in the college. We are also organizing the first Data Science & Analytics Career Fair to be held this fall. More details can be found in the STORies below.

Related to our programs, our undergraduate major and minor continue expanding, with the combined number of 1000+ students in each of the last two years. The major was even among Carolina's top 10 majors from the Class of 2021. The department once again attracted an excellent and diverse incoming class of graduate students introduced in the STORies below. The class will continue to follow a revamped graduate curriculum, which we constantly work on improving.

Looking ahead at the new academic year 2021/2022, the department's priorities include the continued push into data science (with data science major, data science lab and other initiatives), revamping our MS program, and planning for the celebration of department's anniversary. Indeed, it has been 75 years since the foundation of the Department of Statistics, and around 50 years since Operations Research started as a curriculum program. The ongoing pandemic has hampered our planning for the anniversaries, but we hope for some celebration in 2022.

Do continue supporting the department in any way you can!

Sincerely,



VLADAS PIPIRAS
CHAIR

HIGHLIGHTS



Richard Smith
PROFESSOR

Professor Smith has been named a Fellow of the American Association for the Advancement of Science, one of few statisticians to obtain this honor. His nomination cited his work with the statistical analysis of extreme events and environmental applications, including climate change and air pollution.

Dr. Smith holds a joint appointment in biostatistics in the Gillings School of Global Public Health.

AAAS is the world's largest general scientific society and publisher of the journal *Science*, as well as other respected publications.



Serhan Ziya
PROFESSOR

Professor Ziya is using his expertise to help hospitals and emergency departments allocate limited resources most efficiently.

Along with doctoral student Qian Cheng, Ziya and his colleagues have developed software called COVID-CAT, short for COVID-19 capacity analysis tool, to help hospitals analyze their capacity for a large influx of patients.

The program uses predictions of COVID-19 patient arrivals and then extrapolates demands for beds in the emergency department, main hospital and ICU. The central thrust is to identify if there will be a surge — and if there is, when the need for beds will be affected, what the magnitude may be and what daily bed capacity would meet patient demands in mass casualty events.



Amarjit Budhiraja
PROFESSOR

Professor Budhiraja was appointed an Interim Director of the Chairs Leadership Program at the Institute of Arts and Humanities for the period from July 1, 2021, to June 30, 2022.

The Chairs Leadership Program is a program of the College of Arts and Sciences offered in collaboration

with the Institute for the Arts and Humanities.

It offers first-time and reappointed chairs a year of monthly confidential conversations in which they can share ideas, identify best practices and explore important issues related to the important roles they play within the university.

GRADUATE PROGRAM

SHANKAR BHAMIDI

GRADUATE PROGRAM DIRECTOR



One of my enduring memories growing up was seeing Karate Kid series with my dad in the 90's. There is one scene where the sensei, Miyagi-san, describes the fundamental importance of balance not just in karate but in life and my dad pausing the VCR and having an extended discussion with me about this. The last year has driven home both the crucial role balance plays in every aspect of my life and (for the lack of a better phrase) the importance of social contact. Salient points include:

- a) Balancing the sorrows of the last year with gratitude for the wonderful community we have in the department.
- b) Balancing the drive towards long term goals with measured attachment to outcomes owing to exponential growth in uncertainty.
- c) Balancing the joy of students who graduated this year, overcoming superhuman adversities and landing phenomenal positions in universities and companies across

the country with the daunting challenges faced by the current students and the inability to interact with their own colleagues let alone faculty and staff.

Last year we witnessed massive changes owing to reorganization and unification of the graduate program in the midst of a raging pandemic. Our goal this year is to balance this with providing as much access as possible to both professional and personal mentorship. This includes:

- Work on the new Data Science Lab initiative to foster and develop teams working on cutting edge problems with industry and academic partners.
- Work on structuring our industry outreach program through an Industry Day either in late Fall or early Spring and have a structured mechanism to find capstone projects, internships, and jobs for our graduate students.
- Facilitate alumni communication with current graduate students.

Through Zoom and in person colloquiums at the beginning of the Fall a number of our alumni have done wonderful Q&A sessions giving invaluable advice to current graduate students AND faculty.

- Develop concrete opportunities for mentorship between faculty and graduate students whether this be through round tables, faculty research and life journeys, etc.
- Increase collaboration at the graduate level between other programs at UNC as well as our sister schools in the area including NC State, NC Central and Duke as well as local industries.

Despite my area being in the world of networks, I think the last year has truly driven home how interconnected we all are and how the future relies on our ability to work intensely together on some of the most major issues facing this wonderful spaceship called Earth. Please keep in touch and if you have great ideas on how we can collaborate do not hesitate to reach out.

UNDERGRADUATE PROGRAM



SERHAN ZIYA

UNDERGRADUATE
PROGRAM DIRECTOR

This academic year is promising to be another exciting year for our undergraduate program with new courses, an inaugural career fair, and a new minor in Data Science. First, let me give some numbers and recognize our award recipients. Our program continues to be one of the most popular on campus. We graduated a record 150 STAN students back in May with total number of graduates over the whole year reaching 177, and we now have more than 1000 students with a declared major or minor in STAN. Our students are trained in methodologies that are in high demand in the industry, and therefore there is no doubt that our program will continue to be highly attractive for UNC students.

Once again, the pandemic prevented us from holding a graduation ceremony in May. However, we gave our annual STAN and Mann awards to four outstanding

graduating seniors. Kush Patel, Gabrielle Ruehle, Wencheng Zhang shared this year's STAN award, which is given to graduating STAN majors who have truly excelled in their course studies and/or stood out among their peers by the potential they have shown through their achievements in STAN related activities outside the classroom. Moreau Mo received the Mann award, which is given to graduating majors who have shown great success and future potential in actuarial science. Congratulations to all!

We started this academic year with a curriculum enriched by two new courses added to our permanent catalog. STOR 515: Dynamic Decision Analytics and STOR 557: Advanced Methods of Data Analysis. Our department is now also the host of the new Data Science minor, a multidisciplinary program under the College of Arts and Sciences. The new minor, developed

by a committee led by Prof. Olvera-Cravioto, promises to be another highly popular program on campus.

Finally, we are excited to be hosting our inaugural Data Science and Analytics Career Fair on September 15th. With great support from the University Career Services and hard work of our faculty, particularly Profs. Giacomazzo, Lassiter, and Olvera-Cravioto, nearly forty companies will be participating at the fair providing our students opportunities for finding jobs and internships. The fair will be preceded by two workshops held one week and two weeks prior (one for resume preparation and the other for Data Science interview preparation) with the goal of helping our students get ready for the fair. We are delighted to be part of the Data Science and Analytics Career Fair and we look forward to hosting the event for many years to come with even larger participation.

DATA SCIENCE MINOR



MARIANA OLVERA-CRAVIOTO

*ADMINISTRATIVE
COMMITTEE CHAIR*



This Fall has welcomed its first ever class of minors in Data Science. The newly created data science minor is the result of a college-wide effort to offer students from every discipline an opportunity to discover the rapidly growing world of data science. Given our expertise in statistics, optimization, machine learning and decision making, the Statistics and Operations Research Department (STOR) has played a leading role in the creation of this program and is responsible for its administration. However, the data science minor is the result of a truly multidisciplinary effort, spanning over 30 departments across the University, ranging from the natural sciences to the humanities.

The data science minor consists of five courses, three of which are considered core requirements. The technical core requirements, “Data & computational thinking” and “Data & statistical thinking”, provide students with the basic programming skills needed to work with many types of data, as well as the statistical techniques used to draw insights from it. Tapping into Carolina’s humanistic tradition, the third core requirement exposes students to many of the ethical, cultural, and societal issues that the data science revolution has brought with it.

To complete the minor, students must take two electives chosen from a list of 70+ courses across 30+ different departments. The wide choice of electives makes

sure that students from every major have an opportunity to see how data science is being used in their own fields. Every course in the list of possible electives has been selected to give students valuable hands-on experience working with data. The flexibility of the program allows students to design their minors in the way that best suits their career goals, whether by focusing on application courses within specific fields, or by taking methodological courses to learn about the many algorithms used in today’s data science industry.

We at STOR are excited about this new program, which is off to a great start.



Adam Waterbury

PH.D. STUDENT

I don't think that there are many better places to study statistics than UNC-Chapel Hill. As a student in the STOR Department, I always felt like everyone was doing their best to support me

and my peers. The department's faculty members helped me so much academically and professionally through mentoring, teaching, and advising, and the staff members always ensured that everything went smoothly for me and the students in my classes. The STOR Department really is an exceptional place to study and to teach, not only because of the work that goes on there, but also because of the people in it. Beyond UNC and the STOR Department, the towns of Chapel Hill and Carrboro have so much to offer

– beautiful parks and walking paths, great restaurants, concert venues, coffee shops, and more – that it's not easy for me to list my favorite things about living there. Some of my fondest memories of my time at UNC are the evenings I spent hanging out with friends outside of Weaver Street Market or picking up food from Mediterranean Deli to bring to Beer Study. I'll miss Chapel Hill and the STOR Department, and I'm thankful that I was able to study there.

STORies



Gabrielle Ruehle

UNDERGRAD STUDENT

At the beginning of my journey at Carolina, I had no idea what I wanted to study. I bounced around from Chemistry to Biology to finally land on Mathematics,

but I knew something was missing. When I took my first STOR class in sophomore year, I was hooked! I loved how easily I could use the math I enjoyed to discover more about the world around me. Whether it's predicting future events or uncovering some hidden pattern, statistics allowed me to find answers I could previously only guess. One of my favorite courses was Intro to Data Science because I had a way to answer just about any question that popped into my brain. If I wanted to graph effects due to climate change, I

could do that. Or if I just wanted to predict how much UNC was going to beat Duke by, I could do that too. As I start my master's program at the Institute for Advanced Analytics at North Carolina State University, I know that I am more than prepared to continue my education and become a data professional because of the STOR department. I have been so lucky to spend the past couple of years learning from the STOR department, and I hope all Tar Heels love it as much as I did!

STORies



Amarjit Budhiraja

PROFESSOR

Euler's Spoilers

The front page of the Sunday edition of the New York Times on April 26, 1959, announced “*Major Mathematical Conjecture Propounded 177 Years Ago Is Disproved; 3 MATHEMATICIANS SOLVE OLD PUZZLE.*” The mathematicians were E. T. Parker of Remington Rand Univac, and R. C. Bose and S. S. Shrikhande of the Department of Mathematical Statistics at the University of North

Carolina at Chapel Hill — the original name of our department when founded by Harold Hotelling in 1946. The conjecture that they disproved was formed by Euler in his paper “*Recherches sur un nouvelle espèce de quarrés magiques*” in 1782. It stated that there does not exist a pair of orthogonal Latin squares for any natural number n that left a remainder of 2 when divided by 4, examples of such numbers being 6, 10, 14, 18, 22, etc. The conjecture originated from a puzzle Euler was considering: *Imagine that there are 36 officers belonging to six different military regiments, each regiment having six officers of different ranks. How does one arrange them in the form of a square such that each row and column has six officers, and no rank or regiment appears more than once in a row and column?*

Mathematically this corresponds to finding a pair of orthogonal Latin squares with $n=6$. Euler found himself unable to do it and concluded that in fact such a pair did not exist at all. Euler then went on to formulate the conjecture stated above. Although Euler’s proof for $n=6$ had a gap, this case was settled in 1901 by the French mathematician Gaston Tarry. However, Euler’s conjecture remained open for more than 175 years. This conjecture was resolved in the dazzling work of Bose, Parker and Shrikhande who showed that, not only Euler was wrong, the only such number for which Euler’s statement is true is 6! In fact they proved that orthogonal Latin squares exist for *all* natural numbers greater than 6. At Chapel Hill we are proud to call two of these Euler’s spoilers as our own.

STOR is turning 75 (ST) / 50 (OR)!

Our anniversary activities will be announced soon. Keep in touch with us via our website and social media accounts.

 stor.unc.edu

 facebook.com/uncstor

 twitter.com/uncstor



The professors of the Department of Statistics in the early 1960s: Hotelling, Nicholson, Johnson, Hoeffding, Bose, Roy.



Shayna Hill
BUSINESS OFFICER

Lessons from my Groundhog

Every spring my heart is filled with joy when I get the first glimpse of my garden groundhog. Although he devours my clover lawn, I can't help but feel a sense of joy that he made it through the winter and has emerged to continue to battle with

me over my plants. After a long winter hibernation, he looks rough but more determined than ever. I watch him over the summer as he grows fatter in proportion to the amount of my clover he consumes. True gardeners cannot understand my love for this mischievous creature, but I love him just the same. Coming back to campus this Fall I felt a little like my groundhog. It is as if I have been underground for the last 17 months hibernating away from the virus. Until the vaccine became available, I hardly left my house, and I didn't have much contact with family and friends. I wonder if I look as rough as my furry friend as I head into the building each morning. But

there is nothing like the beginning of a new school year to make me feel a sense of renewed hope and determination. I am enjoying coming to work and interacting with staff and faculty. We are cautious and patient with each other as we all get used to being back together. I am grateful for the students who always make me feel like this is the best department on campus. I am as determined as my garden friend to emerge strong and committed to continue to support my department and my team now that we are all back on-site. My groundhog has taught me that, in this department, the clover is indeed always greener.

REFLECTions



Thomas Keefe
GRADUATE STUDENT LIAISON

Hanes Hall was a ghost town this past 16 months, and I'm so glad to be seeing our faculty, staff, and students back in the Hanes hallways. The pandemic hit our community

really hard, because so much of the life of the department is centered on Hanes. This year, so long as we can remain in-person safely, it will be much easier to have a healthy and happy STOR community. I hope we all not just welcome our new MS and PhD cohort, but also make a real effort to make sure our second year MS and PhD students feel at home—many of whom are working in Hanes for the first time.

Coming into the role of graduate student liaison, I view the position as making sure the issues and needs of the graduate students are communicated to the department.

There are natural barriers to issues bubbling up to the top on their own: everyone's busy, we may be uncomfortable bringing up dissatisfactions to faculty, or not knowing if others are feeling the same way. I'm glad that the department has this liaison position because it helps lower those barriers and shows that the department values the needs and opinions of its students. I look forward to a renewed sense of community in the department and pay my respects to the sacrifices that all of us have made in the pandemic, especially our second-year students.



**BUSINESS OFFICER &
CHAIR OF EMPLOYEE FORUM**

Shayna Hill won a C. Knox Massey Distinguished Service Award, one of the most prestigious distinctions for faculty and staff.

In addition to her work for the College of Arts & Sciences, Hill, who has been with the University for 14 years, has been a stalwart Employee Forum delegate and chair, establishing improved links with administration, faculty, staff, and

student leaders since assuming office in 2017.

Hill led the forum — and, by extension, all staff employees — through the opening and reopening of campus during the ongoing COVID-19 pandemic. In response to campus need, Hill stepped forward with humility and grace to lead the Campus and Community Advisory Committee and the Staff Advisory Committee to the Chancellor.

AWARDees



Wonkyung Jang
M.S. STUDENT

Wonkyung Jang has been honored by the Office of the Provost with its Tanner Award for Excellence in Undergraduate Teaching, the highest campuswide recognition for teaching excellence. He taught STOR 155 over the summer as a graduate teaching fellow and received excellent feedback in the student course evaluations.

Wonkyung also attributed his achievement to STOR professors, staffs, and colleagues. “I’d like to express my deepest gratitude for all the enthusiasm and experiences STOR professors, staffs, and colleagues brought to my program – their knowledge, passion, and dedication to teaching and research provided me with a priceless model for my own career.”



Yiyun Luo
PH.D. STUDENT

Yiyun Luo has won the American Statistical Association's Business and Economic Statistics Student Paper Award. He presented his work at Joint Statistical Meetings at Seattle in August this year.

Yiyun has been studying under the supervision of professor Yufeng Liu.

His winning paper, entitled “*Non-parametric Dynamic Pricing Incorporating Contextual Information*”, is joint with Dr. Liu and Professor Will Wei Sun at Purdue University.

The department congratulates its undergraduate students for their great achievements!

Statistics and Analytics Award

Kush Patel
Gabrielle Ruehle
Wencheng Zhang

W. Robert Mann Award

Moreau Mo

AWARDees

The department is very proud of its Ph.D. students for their excellent work!

Outstanding academic performance during first year of PhD studies:

Cambanis-Hoeffding-Nicholson Award

Ben Brown
Puyao Ge
Taebin Kim
Haixu Ma

Outstanding teaching performances:

Walter L. Deemer Excellence in Teaching Award

Brendan Brown
Adam Waterbury

Excellence in Teaching Assistance and Instruction Award

Weibin Mo
Jiaying Li

Outstanding service:

Service and Mentorship Award

Benjamin Leinwand



INCOMING PH.D. CLASS



Panagiotis Andreou
University of Athens

table tennis, guitar, chess



Dilshad Imon
IIT Kanpur

soccer, reading non-fiction



Minji Kim
Seoul National University

TV series, running, biking, workouts



Seong Jin Lee
Seoul National University

video games



Rui Liu
Peking University

basketball, badminton, tennis, hiking



Daniel Meskill
University of Connecticut

rock climbing, traveling, watching movies



Parvathi Meyyappan
Carnegie Mellon University

backpacking, skiing, board games



Michael Nisenzon
Brown University

Reading, taking walks, making crepes



Dawn Sanderson
Air Force Institute of Technology

wine, golfing, pickleball



Andrew Walker
UNC Chapel Hill

hiking, playing guitar



Isabel Wiesenthal
Pomona College

coffee, water polo, music



Wan Zhang
UNC Chapel Hill

photography, cats, cooking

SUPPORT STOR

Private giving is now more critical than ever. We welcome your gifts to STOR, either to our unrestricted fund that provides the Chair the flexibility to apply funding where it is needed most at any given time, or to support our existing fund-raising priorities.

HOW TO GIVE

Online:

<https://stor.unc.edu/about/support-us>

Mail:

To make a gift via check, please make check payable to “Arts & Sciences Foundation, Inc.” with the name of the fund you wish to support in the memo line and mail to:

Cassie Diltz
Director of Development
The Arts and Sciences Foundation
The University of North Carolina at Chapel Hill
523 East Franklin St
Chapel Hill, NC 27514

Remember that matching gifts can double or triple your gift. If you or your spouse works for a matching gift company, please ask your personnel officer for a matching gift form to send in with your gift.

QUESTIONS

For questions about creating scholarships and professorships, making stock or estate gifts, donating to specific programs, please contact:

Cassie Diltz
Director of Development
The Arts and Sciences Foundation
919-843-0345
cassie.diltz@unc.edu

Department Discretionary Fund

This fund covers activities and initiatives at all levels, including career development, lecture series, stipends, and community outreach.

Graduate Opportunity Fund

This newly created endowment provides support for undergraduate and graduate students in the department who enhance the diversity of the student body of the department, with particular emphasis on graduate student support.

Raj Chandra Bose Graduate Student Travel Fund

This endowed fund through Gary G. Koch and Carolyn J. Koch and friends of the Department of Statistics and Operations Research provides support for graduate student travel.

Dr. Walter L. Deemer Excellence in Teaching Fund

This endowed fund is used to annually recognize and reward teaching excellence of a faculty member and/or graduate student in the department.

Hoeffding Scholarship Fund

Contributions to this fund support scholarship awards to graduate students. Awards are made based on demonstrated academic merit.