DECEMBER 2023

TEXAS A&M UNIVERSITY
Statistics

ISSUE 5

StatLinks

THE OFFICIAL NEWS FROM THE TEXAS A&M DEPARTMENT OF STATISTICS
TO LINK FRIENDS AND FORMER STUDENTS

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MESSAGE FROM THE **DEPARTMENT HEAD**

Dear faculty, staff, students, former students, and friends of the department,

As the Fall 2023 semester concludes, it is an opportune moment to reflect on the events of the past year. The operational challenges faced during the integration of our department with the new college, housing 18 diverse departments, have now been largely resolved. Most of our procedures have seamlessly adapted, thanks to the hard work and dedication of the department and the College.

Under the current leadership, the College of Arts and Sciences is buzzing with enthusiasm, diligently striving to ensure that operations run smoothly and effectively. The college aspires to be a national leader in high-impact educational and co-educational practices, providing students with unparalleled access to research opportunities.

Furthermore, the College of Arts and Sciences is committed to growing as a world leader in scholarship. This requires strategic investment in staff, faculty, and students, ensuring they have the resources and support needed to push the boundaries of knowledge, engage with the broader community, and make lasting contributions to society.

In 2023, the Department welcomed two APT faculty members and an Associate Professor, along with the appointment of a new Director for the Statistical Consulting Center. A particularly noteworthy accomplishment was our success in student recruitment, with increased enrollments across all academic levels, creating a vibrant and diverse academic community. This edition of StatLinks showcases our notable achievements, ranging from securing external funding to receiving awards, publishing impactful research, and fostering collaborative endeavors.

As we approach the Winter Break, Holiday Season, and the start of the Spring 2024 semester, I extend my heartfelt gratitude to our dedicated faculty, staff, postdocs, and students for their unwavering commitment to excellence. A special acknowledgment is reserved for Judith Moreno for her professional efforts in compiling this issue of StatLinks and capturing the essence through captivating photos.

Together, we eagerly embrace the future, poised to confront new challenges and seize exciting opportunities in our continuous pursuit of excellence in statistical research, education, and service to the school and profession. We will continue to advance Texas A&M's core values of respect, excellence, leadership, loyalty, integrity, and selfless service.

Wishing you a delightful and safe holiday season and a Happy New Year!

BRANI VIDAKOVIC
H.O. Hartley Chair and Department Head

FACULTY
AWARDS AND RECONGITIONS

TORYN SCHAFER

Dr. Toryn Schafer received funding as the academic partner on the Sandia National Labs LDRD (Lab-Directed Research & Development) for her project "Machine Learning for Data-Driven Closure Models in Earth Systems."

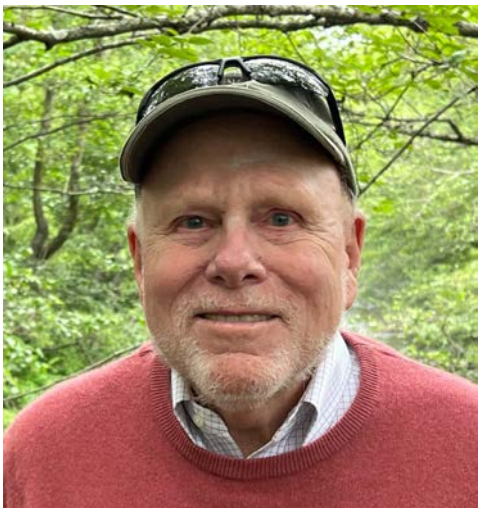
She also received funding from The National Park Service for her research "Generate a Quantitative Assessment of the Implications of, and Alternatives to, Fully Opening Johns Hopkins Inlet to Cruise Ship Visitation."

NING "PATRICIA" NING

In 2024, Dr. Ning will contribute as a Scientific Committee member to the 45th Midwest Probability Colloquium in Chicago, a renowned and longstanding probability conference in North America.

Concurrently, she secured new funding from NIH (award number R21AI180492) with a total grant of $230,000 as the co-Principal Investigator.

Additionally, Dr. Ning received the International Travel Conference Grant from Texas A&M University.



RAYMOND CARROLL

On November 9, Dr. Carroll received the first-ever Jeremy Taylor Mentorship Award from the Department of Biostatistics at the University of Michigan.

Additionally, Dr. Carroll serves as the Principal Investigator for a subcontract awarded by Harvard University as part of a grant from the National Cancer Institute. The project spans from January 1, 2024, to December 31, 2028, and focuses on epidemiological methods in cancer research in the context of uncertainty in the measurement of exposures.

VALEN JOHNSON

Dr. Valen E. Johnson has been appointed to the George P. Mitchell '40 Endowed Chair in Statistics, a position established in 2006 by George P. Mitchell, a distinguished petroleum engineering graduate from Texas A&M Class of 1940. This chair was established to support Dr. H. Joseph Newton, the Emeritus Professor of Statistics and Dean Emeritus of Science at Texas A&M. The purpose of this support is to facilitate the advancement of programs within the former College of Science during Dr. Newton's tenure as dean and, subsequently, to enhance faculty and related programs within the Department of Statistics.

BRANI VIDAKOVIC

Dr. Brani Vidakovic has been elected as a member of the Board on Mathematical Sciences and Analytics (BMSA) at the National Academies. The BMSA is dedicated to organizing studies, workshops, and various activities aimed at providing mathematical science and statistical advice.

Furthermore, Dr. Vidakovic was elected representative for Districts 4 and 5 on the ASA's Executive Committee of the Caucus of Academic Representatives.

STAFF
AWARDS AND RECONGITIONS

At the recent Joint Statistical Meetings (JSM) held during the 2023 Aggie Reunion, **Judith Moreno** was honored with the prestigious Ersen Arseven '74 Annual Staff Award. Bestowed by the Department of Statistics, this award is an annual acknowledgment of excellence dedicated to recognizing the outstanding contributions of staff members. Judith's notable achievements and unwavering commitment to her role have rightfully earned her this esteemed accolade.

Adding to the accolades, **Andrea Dawson** received the 2023 12th Man Award, a recognition of her enduring and impactful contributions to the Department of Statistics. As a testament to her long-term dedication, the 12th Man Award highlights Andrea Dawson's service and sustained commitment.

Both Moreno and Dawson's recognition at the Aggie Reunion exemplifies the department's commitment to acknowledging and celebrating the significant contributions of its staff members.

These awards not only serve as a testament to these individual accomplishments but also underscore the collaborative and high-achieving spirit within the Department of Statistics.

COURTNEY SHUTTLESWORTH

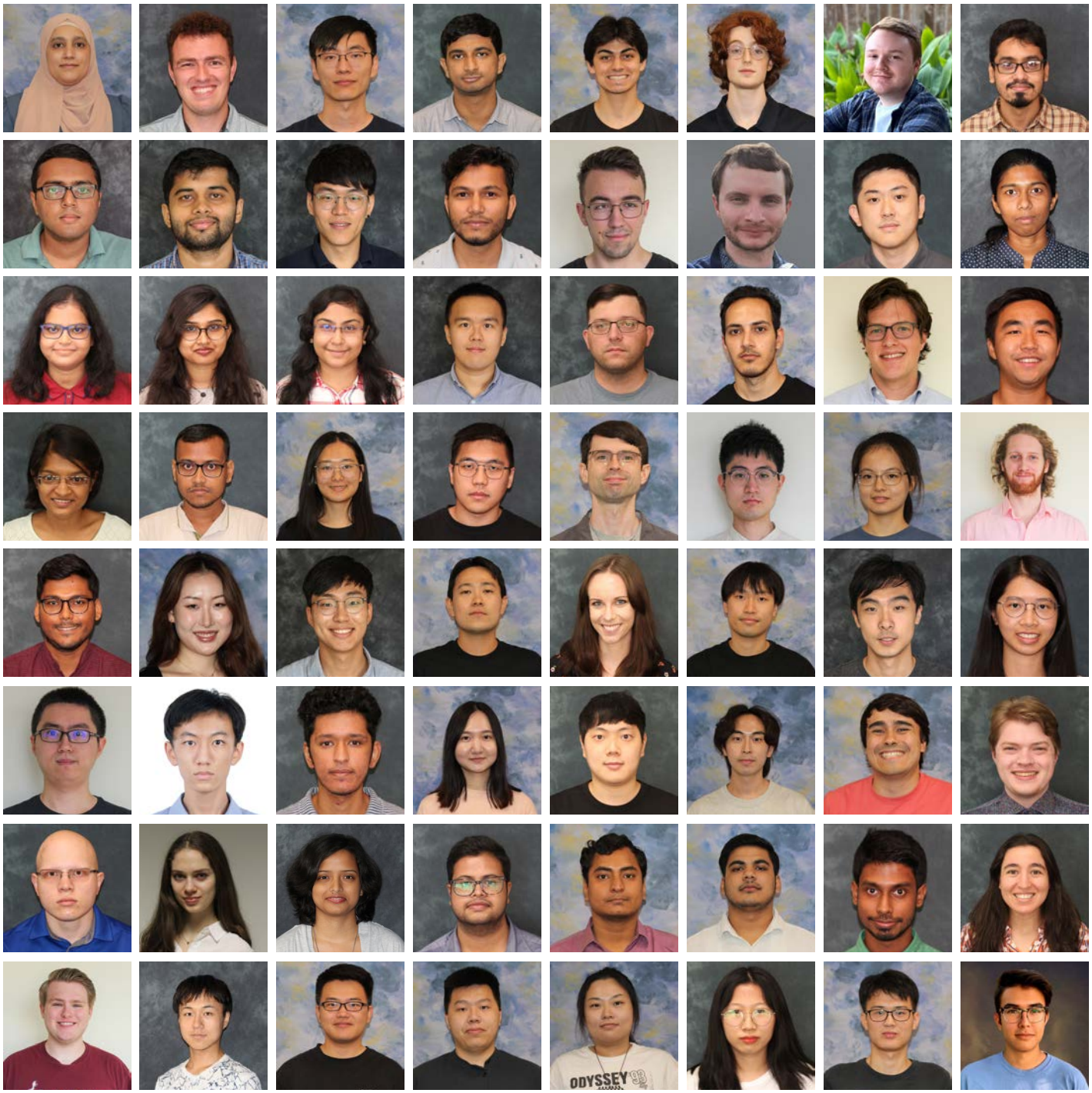
Courtney Shuttleswork, Academic Advisor III in our department, concluded her academic journey with distinction, earning an M.S. in Educational Human Resource Development with a specialized focus on Adult Education. Recognizing her outstanding achievements, the faculty in her program, housed within the esteemed School of Education and Human Development, accorded her the title of Distinguished Honor Graduate.

This prestigious accolade was bestowed upon Courtney for her remarkable academic prowess, exemplary leadership, the promise of future impact, and a profound passion for transforming lives. Her award letter explicitly stated that Distinguished Honor Graduates are selected based on these criteria, solidifying Courtney's position as a standout student in the School of Education and Human Development. This recognition underscored not only her academic excellence but also her potential to make a lasting impact in the field of educational human resource development.

As she embarked on the next chapter of her journey, Courtney carried with her the distinction of being a Distinguished Honor Graduate, symbolizing her dedication to academic excellence and the transformative power of education.

"This reward reflects not only my academic accomplishments, but also my professional accomplishments working with students, training staff, and volunteering in advising organizations while pursuing my degree. I am so thankful to be a part of the STAT department; the department has offered many opportunities for growth and leadership in my role and is a huge reason I have been able to accomplish so much professionally while also pursuing my master's degree."

MEET OUR
PHD STUDENTS



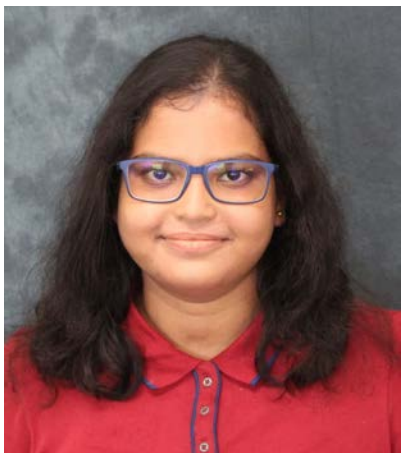
GRADUATE STUDENTS
AWARDS AND RECONGITIONS

REBECCA LEE
Ruth J. and Howard F. Newton Memorial Graduate Student Teaching Award in Statistics

JOSE R. ACOSTA
William S. Connor Award

HYUNWOONG CHANG
Emanuel Parzen Graduate Research Fellowship Award

ABHISEK CHAKRABORTY
Emanuel Parzen Graduate Research Fellowship Award



SNIGDHA DAS
Anant M. Kshirsagar Endowment

GOZDE SERT
SGSA Award

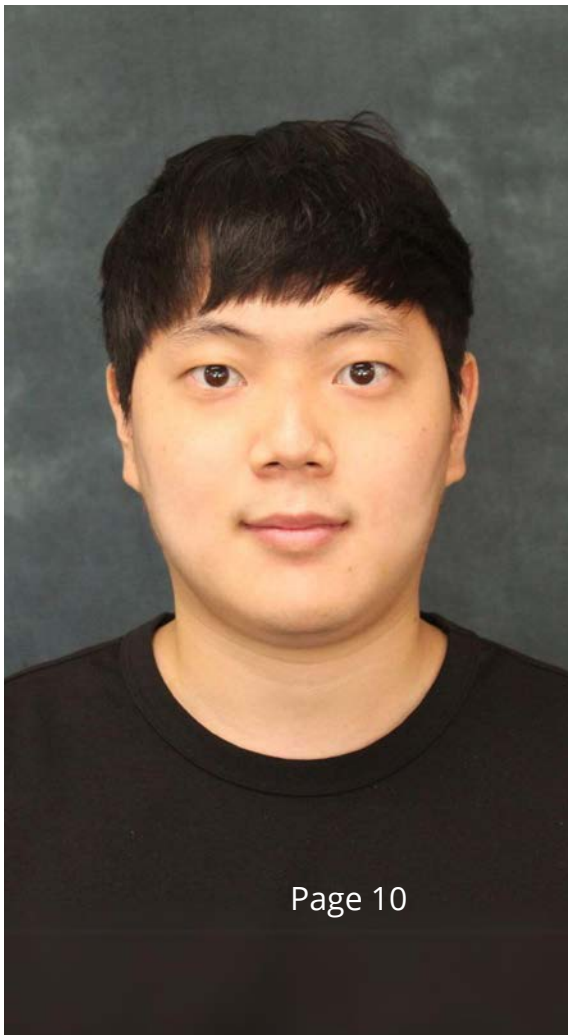
NSF MSGI INTERNS
SPOTLIGHT INNOVATIVE RESEARCH ACHIEVEMENTS

This summer marked a significant achievement for two of our students who actively participated in the NSF Mathematical Sciences Graduate Internship (MSGI) program. Their outstanding contributions were acknowledged and highlighted at the program's symposium on August 22-23, 2023. This virtual two-day event served as a platform for doctoral student interns to showcase their research and share insights gained from their summer placements at the Department of Energy (DOE) and various federal national laboratories nationwide.

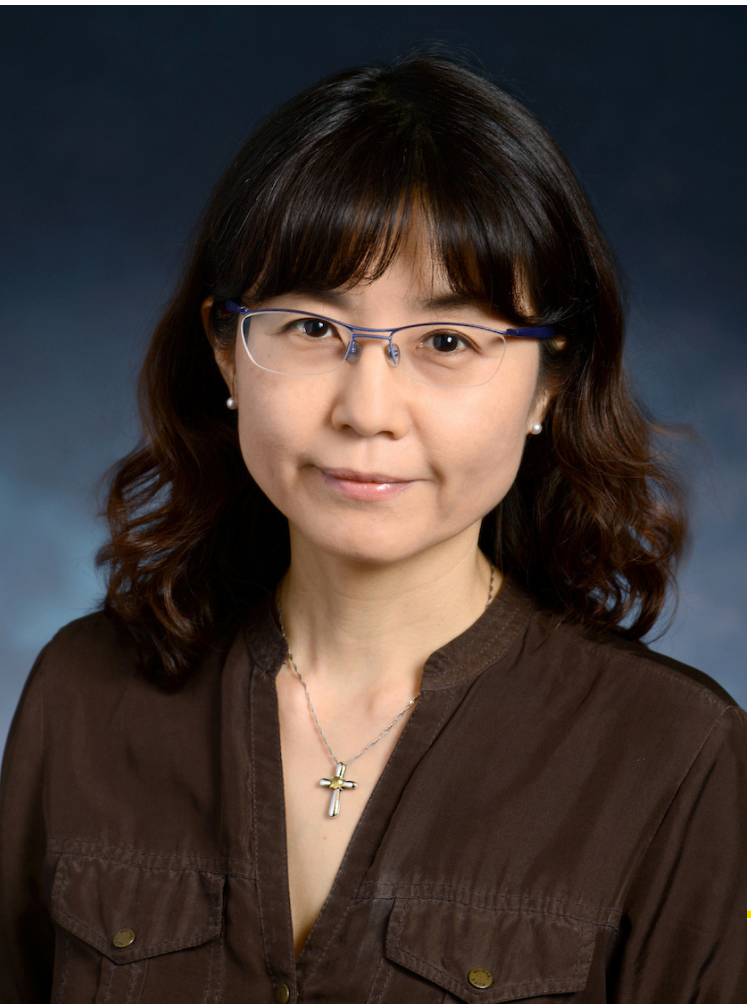
The symposium encompassed diverse presentations in applied mathematics, pure mathematics, and statistics, featuring traditional-style sessions focused on research outcomes. Additionally, the event included valuable panel discussions with current mentors and former MSGI interns, aiming to emphasize the program's broad research experiences and encourage knowledge-sharing among participants.

In collaboration with the National Institute of Standards and Technology, **Jiyoung Park** presented his research on "Uncertainty Quantification in U-Net Image Segmentation with Geometric Encoding." Following, **Isaac Ray** presented his collaborative research with the Los Alamos National Laboratory on "Bayesian Nonparametric Deep Clustering of Remote Sensing Scenes through Transductive Transfer Learning."

For those eager to delve into the intriguing research presented, detailed information along with the link for the virtual presentations, can be found at this link. The symposium not only highlighted the accomplishments of these interns but also emphasized the impactful nature of the MSGI program in advancing cutting-edge research in mathematical sciences.



FORMER **STUDENTS**



The Department of Statistics at Texas A&M takes great pleasure announcing that **Dr. Eun Sug Park '97** has been honored with the 2023 H.O. Hartley Award. This annual award is presented to a former student of the Department of Statistics at Texas A&M University in recognition of their distinguished service to the field of Statistics.

Dr. Park is renowned for her research in traffic safety statistics, her investigations into the impact of public transportation on reducing air pollution, and her authorship of a book on traffic simulation.

Having earned her Ph.D. at the Department of Statistics at Texas A&M under the guidance of Dr. Clifford H. Spiegelman, Dr. Park has since become a Fellow of the American Statistical Association, an Elected Member of the International Statistical Institute, and a member of the TRB Statistical Methods Committee. Additionally, she serves as the Statistics Editor for the journal Chemometrics and Intelligent Laboratory Systems.

JEFFREY MACA ‘97
NAMED ASA FELLOW

In a significant development, the statistical community marked the election of Dr. Jeffrey Maca '97 as an ASA Fellow in 2019. The acknowledgment of his prestigious honor brought joy not only to Dr. Maca but also resonated with the broader community. The eleventh student of his mentor, Dr. Raymond Carroll, to achieve ASA Fellow status, Dr. Maca's accomplishment underscores the lasting impact of mentorship on statistical excellence.

Dr. Maca '97, reflecting on his lifelong aspiration to become an ASA Fellow, shared that the journey commenced in Dr. Carroll's office. An Amstat news article sparked a dream that seemed distant but ultimately transformed into a tangible reality with the news of his election.

Acknowledging the crucial support received, Dr. Maca '97 expressed gratitude to Paul Gallo, a colleague and mentor who played a pivotal role in guiding him through the application process. The collaborative spirit within the statistical community was evident as Paul orchestrated the entire endeavor. Jeff Morris '00, in a casual conversation at JSM, provided encouragement and recognition of Dr. Maca's qualifications, inspiring him to pursue the fellowship. This support served as the catalyst that empowered Dr. Maca to seek and achieve this esteemed recognition.

Dr. Maca's journey to the ASA Fellowship is not only a personal triumph but also a testament to the collaborative and supportive nature of mentorship within the statistical community. It highlights shared victories, where mentor and mentee contribute collectively to the advancement of statistical excellence, fostering a spirit of collaboration and achievement.

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E V E N T S

A U G U S T | S E P T E M B E R | O C T O B E R |

N O V E M B E R | D E C E M B E R

TEXAS A&M UNIVERSITY
Statistics

The Department of Statistics presents

FALL 2023 COLLOQUIUM

ERIC LABER

Distinguished Professor, Statistical Sciences and Biostatistics and Bioinformatics, Duke University

FRIDAY, AUGUST 25, 2023 | 11:30 AM | BLOCKER 150

Reinforcement Learning for Respondent-Driven Sampling

Respondent-driven sampling (RDS) is a network-based sampling strategy used to study hidden populations for which no sampling frame is available. In each epoch of an RDS study, the current wave of study participants are incentivized to recruit the next wave through their social connections. The success and efficiency of RDS can depend critically on attributes of incentives and the underlying (latent) network structure. We propose a reinforcement learning-based adaptive RDS design to optimize some measure of study utility, e.g., efficiency, treatment dissemination, reach, etc. Our design is based on a branching process approximation to the RDS process, however, our proposed post-study inferential procedures apply to general network models even when the network is not fully identified. Simulation experiments show that the proposed design provides substantial gains in efficiency over static and two-step RDS procedures.

Biography

Eric Laber is the James B. Duke Distinguished Professor of Statistical Sciences and Biostatistics and Bioinformatics at Duke University. His research focuses on methodological development for data-driven decision making. His work has been applied to inform decision making in addiction, cancer, HIV/STI prevention, Ebola virus disease, wildlife management, and assortment selection in e-commerce. He is also passionate about K-12 STEM outreach and developing the next generation of statistical scientists.

TEXAS A&M UNIVERSITY
Statistics

The Department of Statistics presents

FALL 2023 COLLOQUIUM

CHUNG EUN LEE

Associate Professor, Department of Information Systems and Statistics, Baruch College

FRIDAY, SEPTEMBER 1, 2023 | 11:30 AM | BLOCKER 150

Dimension Reduction for Tensor Response Regression Models

In this talk, we propose a flexible model-free approach to the regression analysis of a tensor response and a vector predictor. Without specifying the specific form of the regression mean function, we consider the estimation of the dimension reduction subspace that captures all the variations in the regression mean function. We propose a new nonparametric metric called tensor martingale difference divergence, and study its statistical properties. Built on this new metric, we develop computationally efficient estimation and asymptotically valid procedures. We demonstrate the efficacy of our method through both simulations and a real data application for e-commerce.

Biography

Dr. Chung Eun Lee is an Associate Professor in Paul H. Chook Department of Information Systems and Statistics, Zicklin School of Business at Baruch College. Her research interests are primarily in statistical methodology for dimension reduction, time series, functional data, and tensor data. Her work has been published in the Journal of the American Statistical Association (Theory and Methods), Biometrika, Statistica Sinica., Journal of Business & Economic Statistics. She is also interested in statistical applications in real-world problems of business and industry. Prior to joining Baruch College, she was an Assistant Professor at the Department of Business Analytics and Statistics, Haslam College of Business, University of Tennessee, Knoxville. Dr. Lee holds an M.A. in Statistics from Columbia University and a Ph.D. in Statistics from University of Illinois at Urbana-Champaign.

TEXAS A&M UNIVERSITY
Statistics

The Department of Statistics presents

FALL 2023 COLLOQUIUM

XIANG ZHOU

Professor, Department of Biostatistics, University of Michigan

FRIDAY, SEPTEMBER 8, 2023 | 11:30 AM | BLOCKER 150

Statistical Methods for Spatial Transcriptomics

Spatial transcriptomics is a collection of groundbreaking new genomics technologies that enable the measurements of gene expression with spatial localization information on tissues or cell cultures. Here, I will discuss a few new statistical methods that our group has recently developed for analyzing spatial transcriptomics data. Specifically, I will first talk about SPARK, a method that allows for rigorous statistical analysis of spatial expression patterns in spatial transcriptomics. I will talk about a non-parametric extension of SPARK, called SPARK-X, for scalable and effective detection of spatially expressed genes in large spatial transcriptomic studies. If time allows, I will also talk about a spatially informed cell type deconvolution method, CARD, that leverages cell type specific expression information from single cell RNA sequencing for the deconvolution of spatial transcriptomics.

Biography

Dr. Xiang Zhou is a Professor in the Department of Biostatistics in the School of Public at the University of Michigan. He is also an Assistant Director at the University of Michigan Precision Health. He has been a Professor since 2023. Dr. Zhou joined the department as an Assistant Professor in 2014, became the John G. Searle Assistant Professor in 2018-2019, and was an Associate Professor in 2019-2023. Before joining UM, he was a Williams H. Kruskal Instructor in the Department of Statistics at the University of Chicago in 2013-2014. He received an MS degree in statistics in 2009 (adviser: Prof. Scott Schmidler) and a PhD degree in neurobiology in 2010 (adviser: Prof. Fan Wang), both from Duke University. He was a postdoctoral scholar working with Prof. Matthew Stephens at the University of Chicago during 2010-2013. He is currently an Associate Editor for the journal Annals of Applied Statistics and the Elected Program Chair of the Section on Statistics in Genomics and Genetics in the American Statistical Association.

TEXAS A&M UNIVERSITY
Statistics

The Department of Statistics presents

FALL 2023 COLLOQUIUM

JIAN KANG

Distinguished Professor, Department of Biostatistics,
University of Michigan

FRIDAY, SEPTEMBER 15, 2023 | 11:30 AM | BLOCKER 150

Regression Analysis of Neuroimaging Data Leveraging Deep Neural Networks

The complex interplay between neuroimaging data and variables of interest poses significant challenges for conventional regression models. These challenges are due to the ultra-high dimensionality, varying levels of noise, and limited sample sizes inherent to this type of data. In this talk, I will introduce a series of regression models specifically designed for neuroimaging data analysis, utilizing Deep Neural Networks (DNN) to enable more accurate statistical inference. Unlike traditional approaches, our innovative methods offer enhanced flexibility in capturing intricate patterns in brain activity, accommodating the heterogeneity in noise levels and spatial dependencies across different brain regions. I will delve into parameter estimation, inference procedures, and the theoretical underpinnings of our advanced models, ultimately demonstrating their superior performance over existing methodologies through rigorous simulations and real-world neuroimaging case studies.

Biography

Dr. Jian Kang received his BS in Statistics from Beijing Normal University in 2005 and received MS in Mathematics from Tsinghua University in 2007. He obtained PhD in Biostatistics at the University of Michigan, Ann Arbor, in 2011. From 2011 to 2015, Dr. Kang was a faculty member at Emory University. Since 2020, Dr. Kang has been a Professor of Biostatistics at the University of Michigan, Ann Arbor. His main research interests are developing statistical methods and theory for large-scale complex biomedical data analysis with focuses on Bayesian methods, machine learning, imaging statistics and precision medicine. Dr. Kang has been elected as the Fellow of the American Statistical Association since 2021.

TEXAS A&M UNIVERSITY
Statistics

The Department of Statistics presents

FALL 2023 COLLOQUIUM

LIKUN ZHANG

Assistant Professor, Department of Statistics,
University of Missouri

FRIDAY, SEPTEMBER 22, 2023 | 11:30 AM | BLOCKER 150

A Novel Extreme Value Autoencoder Framework for Probabilistic Model Emulation and Calibration

Large physics-based simulation models are crucial for understanding complex problems related to energy and the environment. These models are typically quite computationally expensive and there are numerous computational and uncertainty quantification (UQ) challenges when using these models in the context of calibration, inverse problems, UQ for forward simulations, and model parameterization. Surrogate model emulators have proven to be useful in recent years to facilitate UQ in these contexts, particularly when combined with Bayesian inference. However, traditional methods for model emulation such as Gaussian processes, polynomial chaos expansions, and more recently, neural networks and generative models do not naturally accommodate extreme values, which are increasingly relevant for many complex processes such as environmental impacts due to climate change and anomaly detection. Many statistical methods have been developed to flexibly model the simultaneous occurrences of extremal events, but most of them assume that the dependence structure of concurrent extremes is time invariant, which is unrealistic for physical processes that exhibit diffusive dynamics at short-time scales. We propose to develop a novel probabilistic statistical framework to explicitly accommodate concurrent and dependent extremes within a conditional variational autoencoder (CVAE) engine for enabling fast and efficient uncertainty quantification in model calibration, inverse modeling, ensemble prediction, and parameter estimation contexts. We also propose a new validation framework that is tailored to assess skill in fitting extreme behavior in model outputs. Our approach addresses, for the first time, the need to have efficient surrogate emulators of expensive simulation models that can accurately characterize, in a rigorous probabilistic manner, extreme values that are dependent in space and time and across processes.

Biography

Dr. Zhang is currently an Assistant Professor in the Department of Statistics at the University of Missouri. He received his Ph.D. degree in Statistics from Penn State in 2020, after which he worked with climate scientists at Lawrence Berkeley National Laboratory for two years. His research focuses on extreme value theory and flexible spatial extremes modeling, which has been used to study a variety of weather processes and to detect changes in their long-term climatology. He also incorporates deep learning techniques in spatial extremes modeling so domain scientists can study the dependent extremes on datasets with massive number of locations.

TEXAS A&M UNIVERSITY
Statistics

The Department of Statistics presents

FALL 2023 COLLOQUIUM

ALI SHOJAIE

Professor of Biostatistics and Statistics (adjunct),
University of Washington

FRIDAY, OCTOBER 6, 2023 | 11:30 AM | BLOCKER 150

Inference on Function-Valued Parameters Using a Restricted Score Test

Function-valued parameters that can be defined as the minimizer of a population risk arise naturally in many applications. Examples include the conditional mean function and the density function. Although there is an extensive literature on constructing consistent estimators for function-valued risk minimizers, such estimands can typically only be estimated at a slower-than-parametric rate in nonparametric and semiparametric models, and performing calibrated inference can be challenging. In this talk, we present a general inferential framework for function-valued risk minimizers as a nonparametric extension of the classical score test. We demonstrate that our framework is applicable in a wide variety of problems and describe how the approach can be used for inference on a mean regression function under (i) nonparametric and (ii) partially additive models.

Biography

Ali Shojaie is Professor of Biostatistics and Statistics (adjunct) at the University of Washington (UW). He is Associate Chair of the Department of Biostatistics, founding director of the Summer Institute for Statistics in Big Data (SISBID) at the University of Washington and Lead of the Data Management and Statistics (DMS) Core of the UW Alzheimer's Disease Research Center (ADRC). Originally trained in Industrial and Systems Engineering, he obtained his Ph.D. in Statistics from the University of Michigan, while completing Masters degrees in Applied Mathematics and Human Genetics. Dr. Shojaie's research lies in the intersection of statistical machine learning, statistical network analysis, and applications in biology and social sciences. His research has been recognized by multiple best paper awards. He is an elected Fellow of the American Statistical Association (ASA) and the Institute of Mathematical Statistics (IMS) and a recipient of the 2022 Leo Breiman Award from the ASA Section on Statistical Learning and Data Science (SLDS).

TEXAS A&M UNIVERSITY
Statistics

The Department of Statistics presents

FALL 2023 COLLOQUIUM

JASON XU

Assistant Professor of Statistical Science, Duke University

FRIDAY, OCTOBER 13, 2023 | 11:30 AM | BLOCKER 150

Likelihood-based inference for stochastic epidemics via data-augmented MCMC

We propose novel data-augmented Markov Chain Monte Carlo strategies to enable exact Bayesian inference under the stochastic susceptible-infected-removed model and its variants. In the incidence data setting, where we are given only discretely observed counts of infection, significant challenges to inference arise due only a partially informative glimpse of the underlying continuous-time process. To account for the missing data while targeting the exact posterior of model parameters, we make use of latent variables that are jointly proposed from surrogates related to branching processes, carefully designed to closely resemble the SIR model. This allows us to efficiently generate epidemics consistent with the observed data, and extends to non-Markovian settings as well as tasks such as simultaneous change-point detection under time-varying transmission. Our Markov chain Monte Carlo algorithm is shown to be uniformly ergodic, and we find that it mixes significantly faster than existing single-site samplers on several real and simulated data applications.

Biography

Jason Xu is an Assistant Professor in the Department of Statistical Science at Duke University, with a secondary appointment by courtesy in Biostatistics and Bioinformatics. Prior to joining the faculty at Duke, he was an NSF Mathematical Sciences Postdoctoral Research Fellow at the University of California Los Angeles. He attended the University of Washington as an NDSEG Fellow and holds a PhD in Statistics, supervised by Volodymyr Minin. Jason's broad research interests focus on long-standing computational challenges in statistical inference, and include stochastic process models of epidemic and biological data, EM and MM algorithms for clustering and related non-convex optimization tasks, and iterative algorithms for inference algorithms under structural constraints.

TEXAS A&M UNIVERSITY
Statistics

The Department of Statistics presents

FALL 2023 COLLOQUIUM

FAMING LIANG

Distinguished Professor of Statistics, Purdue University

FRIDAY, OCTOBER 20, 2023 | 11:30 AM | BLOCKER 150

An Introduction to Stochastic Deep Learning

We have developed a new type of stochastic neural network (StoNet), which is formulated as a composition of many simple linear/logistic regression models, and designed an adaptive stochastic gradient MCMC algorithm for its training. The StoNet fits into the framework of statistical modeling, allowing us not only to address fundamental issues in deep learning, such as structural interpretability and uncertainty quantification, but also to provide a platform for transferring the theory and methods developed for linear models to deep learning. We showcase the integration of reproducing kernel methods into deep neural networks to enhance their training and prediction performance. Furthermore, we demonstrate how to use the StoNet to perform nonlinear sufficient dimension reduction and causal inference on high-dimensional data. Lastly, we illustrate how to leverage the StoNet to handle special types of data, such as those with missing values or measurement errors, and how to use it to perform statistical inference for conventional deep neural networks. This talk is based on joint works with Yan Sun, Siqi Liang, and Yaxin Fang.

Biography

Dr. Faming Liang is a Distinguished Professor in the Department of Statistics at Purdue University. Dr. Liang is the Co-Editor of the Journal of Computational and Graphical Statistics. Additionally, he is an IMS and ASA fellow. His research interests include Markov Chain Monte Carlo, big data, bioinformatics, spatial statistics, machine learning, statistical genetics, and stochastic optimization. Dr. Liang was an elected member of the International Statistics Institute in 2005. He also received the Dean's Citation Award in 2016 and the Youden Prize in 2017.

TEXAS A&M UNIVERSITY
Statistics

The Department of Statistics presents

FALL 2023 COLLOQUIUM

KRISHNAKUMAR BALASUBRAMANIAN

Assistant Professor of Statistics, University of California Davis

FRIDAY, OCTOBER 27, 2023 | 11:30 AM | BLOCKER 150

Recent Advances in Non-Log-Concave and Heavy-Tailed Sampling

This talk will be about recent advances in the complexity of sampling from non-log-concave and heavy-tailed densities. Taking motivation from the theory of non-convex optimization, first, a framework for establishing the iteration complexity of sampling of the Langevin Monte Carlo (LMC) when the non-log-concave target density satisfies only the relatively milder Holder-smoothness assumption will be discussed. In particular, this approach yields a new state-of-the-art guarantee for sampling with LMC from distributions which satisfy a Poincare inequality. Next, the complexity of sampling from a class of heavy-tailed distributions by discretizing a natural class of Ito diffusions associated with weighted Poincare inequalities will be discussed. Based on a mean-square analysis, we obtain the iteration complexity in the Wasserstein-2 metric for sampling from a class of heavy-tailed target distributions. Our approach takes the mean-square analysis to its limits, i.e., we invariably only require that the target density has finite variance, the minimal requirement for a mean-square analysis.

Biography

Krishna Balasubramanian is currently an Associate Professor in the Department of Statistics at the University of California, Davis, where he also holds affiliations with the Graduate Group in Applied Mathematics, the Center for Data Science and Artificial Intelligence Research (CeDAR), and the TETRAPODS Institute of Data Science. He served as a visiting scientist at the Simons Institute for the Theory of Computing, UC Berkeley, during the fall semesters of 2021 and 2022. Krishna earned his Ph.D. in Computer Science from the Georgia Institute of Technology and conducted postdoctoral research at both Princeton University and the University of Wisconsin-Madison. His research interests are centered around the intersection of machine learning, optimization, and statistics. Krishna's research has been supported by a Facebook Ph.D. fellowship, as well as grants from CeDAR and the National Science Foundation. He actively contributes to the academic community as an associate editor for the Journal of Machine Learning Research and as a (senior) area chair for conferences like the International Conference on Machine Learning (ICML), Advances in Neural Information Processing Systems (NeurIPS), and the Conference on Learning Theory (COLT).

TEXAS A&M UNIVERSITY
Statistics

The Department of Statistics presents

FALL 2023 COLLOQUIUM

YVES ATCHADE

Professor of Mathematics and Statistics and Computing & Data Sciences, Boston University

FRIDAY, NOVEMBER 3, 2023 | 11:30 AM | BLOCKER 150

Learning to Solve Inverse Problems

Inverse problems (IPs) are ubiquitous in science and engineering. Statistical solutions to IPs are classically formulation as posterior distributions over the quantities of interest or as MAP estimates. However these statistical solutions can be numerically costly to implement and become intractable in some applications (such as remote sensing) where very large numbers of IPs are solved. The talk is an introduction to an alternative approach to IPs that has developed recently in computational imaging which consists in learning directly an IP solution from data using deep neural networks and nonparametric regression methods. I will present some recent results that we have obtained on the posterior contraction of these models in the sparse regime. The enormous challenge of sampling from these posterior distributions will also be discussed.

Biography

Yves Atchade is a Professor of Statistics in the Department of Mathematics and Statistics department and a Faculty of Computing and Data Sciences at Boston University. He received a PhD from the University of Montreal in 2003. His current research deals mainly with Markov Chain Monte Carlo methods, Bayesian inference, and the development of statistical methods for environmental prediction. He is a fellow of the Institute of Mathematical Statistics, and a member of the editorial boards of HDSR, Bernoulli Journal, and JASA.

TEXAS A&M UNIVERSITY
Statistics

The Department of Statistics presents

FALL 2023 COLLOQUIUM

WILLIAM ROSENBERGER

Distinguished Professor, Department of Statistics,
George Mason University

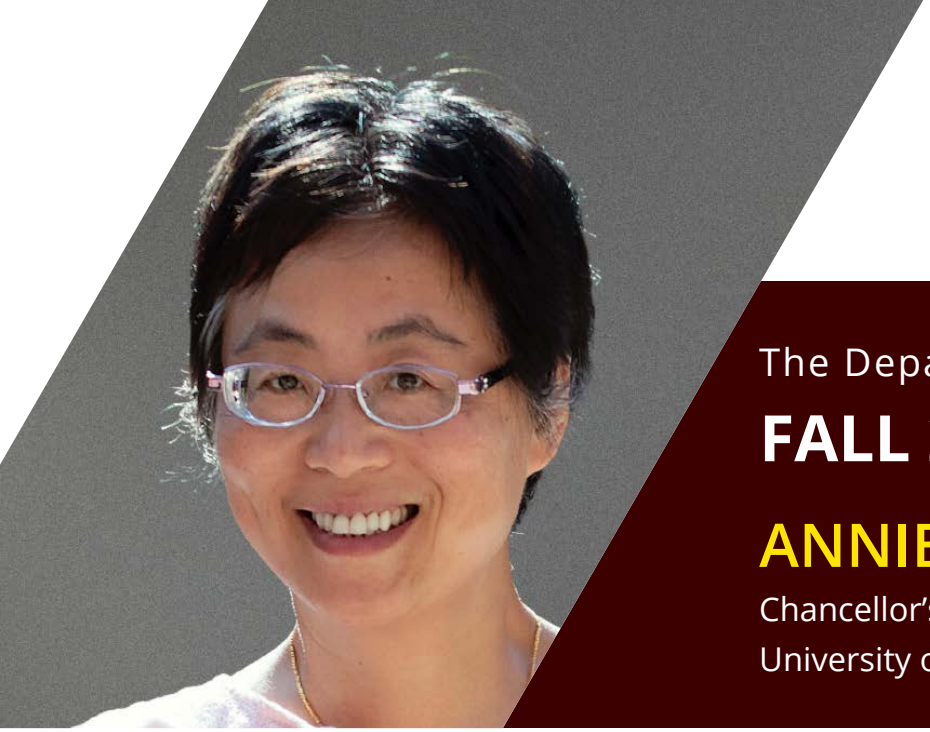
FRIDAY, NOVEMBER 10, 2023 | 11:30 AM | BLOCKER 150

Casual Inference for Clinical Trails: A Spellchecker's Guide to Randomization Tests in Complex Settings

Sir Austin Bradford Hill, the developer of the first randomized clinical trial, was a proponent of simplicity in statistical analysis, and strongly emphasized careful study design as the critical component of all medical studies. While he didn't mention randomization tests in his 1937 book, I believe he would have liked their simplicity and interpretability. Any inference procedure which assumes random sampling from a population ignores Fisherian principles regarding the analysis of designed experiments. And clinical trials are the quintessential designed experiment. While we hear quite often about preservation of type I error rates and, more recently, about causal inference, these are natural elements of a randomization test. We discuss these issues and demonstrate that randomization tests can be used for more complex settings, such as multiple (>2) treatment comparisons, analyses with missing outcome data, and subgroup analyses. It is interesting to note that the only cohort of statisticians NOT excited about randomization tests in this age of causal inference are the designers and conductors of randomized clinical trials!

Biography

William F. Rosenberger is a Distinguished University Professor at George Mason University. He received his Ph.D. in mathematical statistics from George Washington University in 1992 and since then has spent much of his career developing statistical methodology for randomized clinical trials. He has two books on the subject, Randomization in Clinical Trials: Theory and Practice (Wiley, 2002), which won the Association of American Publishers Award for the best mathematics/statistics book published that year, and has recently been issued in a second edition (Wiley, 2016); and The Theory of Response-Adaptive Randomization in Clinical Trials (Wiley, 2006). He is a Fellow of the American Statistical Association (2005) and of the Institute of Mathematical Statistics (2011). An author of over 100 refereed papers, Prof. Rosenberger was named the 2012 Outstanding Research Faculty by the Volgenau School of Engineering, George Mason University, where he also served as Chairman of their Department of Statistics for 13 years, hiring 16 faculty and developing programs at the B.S., M.S. and Ph.D. levels. In 2014, he received a prestigious Fulbright scholarship to support his sabbatical at RWTH Aachen University in Germany. That same year he was promoted to the rank of University Professor (Distinguised University Professor, 2023), which is reserved for "eminent" individuals on the faculty "of great national or international reputation." Only 32 out of 1400 faculty at George Mason have this distinction. In 2017 he was named the 15th Armitage Lecturer at the University of Cambridge, UK. He was elected the North American Editor of the tier-1 biostatistical methodology journal Biometrics, for 2021-2024. He has supervised 20 doctoral students who are now leaders in academia, industry, and government.



TEXAS A&M UNIVERSITY
Statistics

The Department of Statistics presents

FALL 2023 COLLOQUIUM

ANNIE QU

Chancellor's Professor, Department of Statistics,
University of California Irvine

FRIDAY, NOVEMBER 17, 2023 | 11:30 AM | BLOCKER 150

A Model-Agnostic Graph Neural Network for Integrating Local and Global Information

Graph neural networks (GNNs) have achieved promising performance in a variety of graph focused tasks. Despite their success, the two major limitations of existing GNNs are the capability of learning various-order representations and providing interpretability of such deep learning-based black-box models. To tackle these issues, we propose a novel Model-agnostic Graph Neural Network (MaGNet) framework. The proposed framework is able to extract knowledge from high-order neighbors, sequentially integrates information of various orders, and offers explanations for the learned model by identifying influential compact graph structures. In particular, MaGNet consists of two components: an estimation model for the latent representation of complex relationships under graph topology, and an interpretation model that identifies influential nodes, edges, and important node features. Theoretically, we establish the generalization error bound for MaGNet via empirical Rademacher complexity and showcase its power to represent the layer-wise neighborhood mixing. We conduct comprehensive numerical studies using both simulated data and a real-world case study on investigating the neural mechanisms of the rat hippocampus, demonstrating that the performance of MaGNet is competitive with state-of-the-art methods.

Biography

Qu's research focuses on solving fundamental issues regarding structured and unstructured large-scale data, and developing cutting-edge statistical methods and theory in machine learning and algorithms on personalized medicine, text mining, recommender systems, medical imaging data and network data analyses for complex heterogeneous data. The newly developed methods are able to extract essential and relevant information from large volume high-dimensional data. Her research has impacts in many fields such as biomedical studies, genomic research, public health research, social and political sciences. Before she joins the UC Irvine, Dr. Qu is Data Science Founder Professor of Statistics, and the Director of the Illinois Statistics Office at the University of Illinois at Urbana-Champaign. She was awarded as Brad and Karen Smith Professorial Scholar by the College of LAS at UIUC, a recipient of the NSF Career award in 2004-2009. She is a Fellow of the Institute of Mathematical Statistics, a Fellow of the American Statistical Association, and a Fellow of American Association for the Advancement of Science. She is also a recipient of Medallion Award and Lecturer. She is JASA Theory and Methods co-editor in 2023-2025.

TEXAS A&M UNIVERSITY
Statistics

The Department of Statistics presents

FACULTY SPONSORED SEMINAR

PETER MATTHEW JACOBS

PhD Student, Department of Computer Science,
University of Utah

FRIDAY, NOVEMBER 17, 2023 | 1:50 PM | BLOCKER 448

Computationally Efficient and Minimax Optimal Distribution Estimation Under Wasserstein Distance Using Histograms

The Wasserstein is a topologically sensitive distance between distributions. It has found use in applications in a wide range of fields such as image retrieval and finance. Two statistical tasks crucial to using the Wasserstein distance are estimating an unknown distribution underneath the distance from independent samples and estimating the Wasserstein distance between unknown distributions. The latter task is computationally hard when the dimension of the underlying space is >1, with a frequently used minimax optimal solution being to plugin empirical measures and exactly compute the distance, at a cost of \Omega(n^3) where n is the size of the empirical measures. For distributions on [0,1]^d, (where d <=3), we propose a histogram estimator that retains minimax optimality for estimation of a distribution underneath the Wasserstein distance, and implies a much more more computer memory and time efficient algorithm to estimate a Wasserstein distance (that retains minimax optimality even for this problem). We also propose a Bayesian version of this model that achieves posterior contraction rate optimality (for the distribution estimation problem) and can be of use in semi-discrete computation problems.

Biography

Peter is a PhD student in the Kahlert School of Computing at the University of Utah. He is broadly interested in computationally efficient and statistically justifiable data analysis, with most attention devoted to the Bayesian non-parametric setting. He has interned at Sandia National Laboratories since 2021, where has focused on problems involving the Wasserstein distance, mentored by Dr. Debdeep Pati, Dr. Anirban Bhattacharya, and Dr. Lekha Patel.

TEXAS A&M UNIVERSITY
Statistics

The Department of Statistics presents

FALL 2023 COLLOQUIUM

LEAH JOHNSON

Associate Professor, Department of Statistics,
Virginia Tech

FRIDAY, DECEMBER 1, 2023 | 11:30 AM | BLOCKER 150

Trait-based Approaches to Bridging the Gaps Between Mechanistic and Phenomenological Modeling for Ecological Applications

Models for biological and epidemiological processes run the gamut from phenomenological to a mechanistic, including differing amounts of biological information and detail. In this talk, I explore models across this spectrum that are used to understand the spread of vector-borne pathogen spread. I take a trait-based approach, and show how we can use trait data in multiple ways across these models to enable us to make predictions at different scales in space and time. I explore what kinds of trait data can help us answer different kinds of questions in VBD systems and for multiple goals, from prediction to understanding.

Biography

I am an Associate Professor of Statistics at Virginia Tech. I was previously faculty at the University of South Florida, and held research positions at the University of Chicago, UC Santa Barbara, and the University of Cambridge. I did my PhD at UC Santa Cruz in Physics/Applied Math and Statistics. My research interests are in statistical and mathematical biology, ecology, and epidemiology. In particular, I am interested in how individual behavior and local interactions between individuals in a population influence population level patterns, and statistical methodologies for inference of mechanistic models of biological systems.

STATISTICS FORMER STUDENT NETWORK
(SFSN) WEBINARS

HUA LIANG

"SEMIPARAMETRIC MODELS: SEVERAL EXAMPLES"

Professor of Biostatistics, Department of Statistics at
George Washington University

YEHUA LI

"FUNCTIONAL PRINCIPAL COMPONENT ANALYSIS
OF SPATIALLY AND TEMPORALLY INDEXED
POINT PROCESSES"

Professor and Chair of Statistics, Department of Statistics at
University of California at Riverside

YULIA MARCHENKO

"PROFESSIONAL SOFTWARE DEVELOPMENT:
WHAT, WHY, AND HOW?"

Vice President, Statistics and Data Science at
StataCorp LLC. in College Station, Texas

ROBERT REYNOLDS

"ONLY WHAT YOU TAKE WITH YOU:
RESEARCH METHODS FOR HUMAN SYSTEMS
RISKS IN SPACEFLIGHT"

Data Scientist, NASA's Human Health and Performance Directorate
Johnson Space Center in Houston, Texas

AGGIE REUNION

The 2023 Aggie Reunion, an eagerly anticipated annual event held in conjunction with the Joint Statistical Meetings (JSM), unfolded in Toronto, Canada.

The gathering, occurred on August 7, 2023, provided a unique and enriching experience for statisticians from academia, industry, and government to converge, exchange ideas, and explore potential collaborations.

The Joint Statistical Meetings (JSM) itself holds a distinguished status as one of the world's largest statistical events. Beyond its sheer scale, JSM stands out as a platform where professionals from various sectors can engage in meaningful discussions.

This includes not only seasoned statisticians but also provides a valuable opportunity for budding statisticians, including current students, to learn from and interact with their more experienced counterparts.

One of the noteworthy aspects of the Aggie Reunion was the recognition bestowed upon outstanding individuals in the statistical community. Awards were presented to faculty, students, staff, and former students, acknowledging their contributions and achievements.

This moment of celebration added a touch of prestige to an already enriching event, creating lasting memories for all participants.

The 2023 Aggie Reunion, set against the backdrop of Toronto's dynamic atmosphere, left an indelible mark on attendees. It exemplified the spirit of collaboration and knowledge-sharing that defines the Joint Statistical Meetings, fostering connections that will likely resonate within the statistical community for years to come.

6TH ANNUAL SYMPOSIUM

CANCER RESEARCH: BASIC SCIENCE TO BIOINFORMATICS

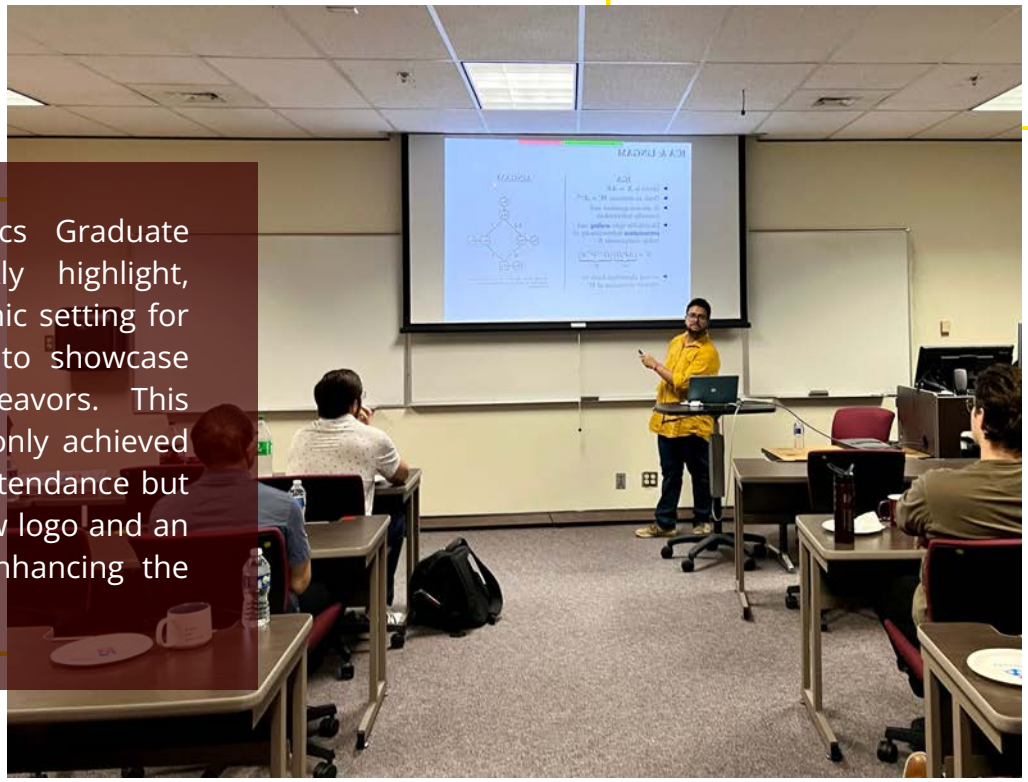
The 6th Annual Symposium, "Cancer Research: Basic Science to Bioinformatics," took place on September 29th, 2023. The event, skillfully organized by committee chairs Bani Mallick from the Department of Statistics and Tapasree Roy Sarkar from the Department of Biology, brought together a diverse group of committee members, including Yang Ni from the Department of Statistics, Irtisha Singh from the Department of Cellular & Molecular Medicine, and Mahul Chakraborty from the Department of Biology.

The symposium featured esteemed speakers who shared their insights and expertise in the field of cancer research. Notable presenters included Nick Navin and Kim-Anh Do, both from MD Anderson Cancer Center, who provided valuable perspectives on the intersection of basic science and bioinformatics in cancer research.

The event served as a valuable platform for professionals and researchers to engage in discussions, exchange ideas, and delve into the latest advancements in cancer research.

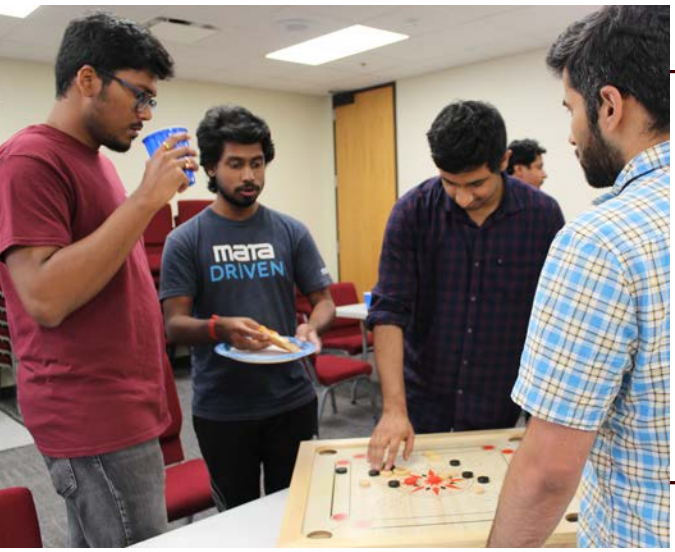
The combined efforts of the organizers, committee members, and distinguished speakers contributed to the success of this enlightening symposium, leaving a lasting impact on the participants and furthering the collective understanding of cancer research.

STUDENT **EVENTS**



Stat Cafe, SGSA's (Statistics Graduate Student Association) weekly highlight, offers an informal yet dynamic setting for faculty and Ph.D. students to showcase their latest research endeavors. This semester, SGSA's team not only achieved an unprecedented level of attendance but also introduced a vibrant new logo and an innovative poster format, enhancing the overall experience.

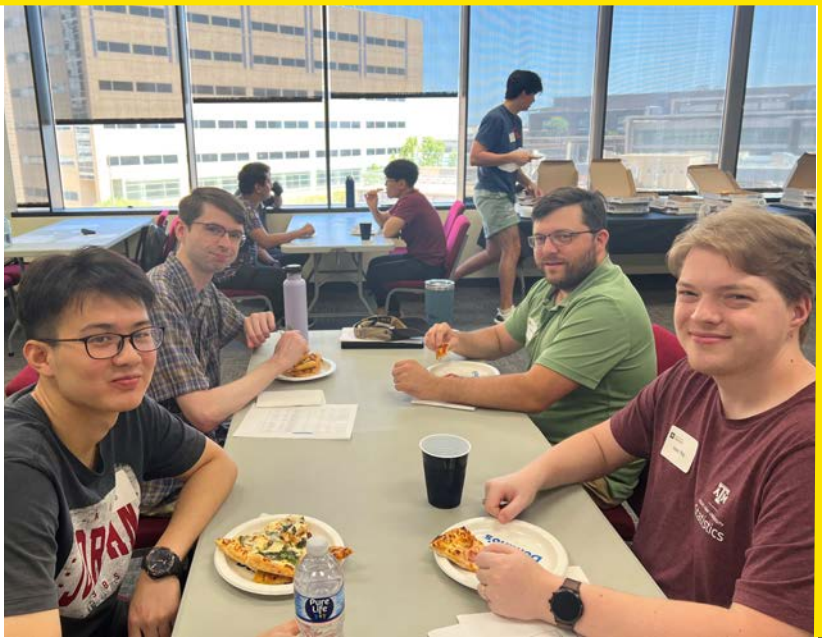
Workflow Workshops, launched this year by SGSA, offer a unique series of tutorials on topics not covered in our regular Colloquiums or Stat Cafes. These workshops aim to provide department members with practical skills and tools beyond traditional classroom learning, enhancing research efficiency and broadening academic exposure.



On September 8, 2023, SGSA hosted a game night for Statistics graduate students and postdocs to unwind and socialize. The event was a fantastic opportunity for them to take a break from their rigorous academic schedules and connect with their peers!

The Department of Statistics' Departmental Climate Committee hosted a Mid-Autumn Festival luncheon. The Mid-Autum, or Moon Cake Festival, is a traditional holiday celebrated in the Chinese culture, where families and friends come together to eat a great meal and honor the moon.

Additionally, the Departmental Climate Committee hosted its annual ASA New Membership Lunch, which provides 1st-year graduate students with the opportunity to join The American Statistical Association, with the department covering their membership for the first year. Students also learned about the prestigious reputation of the organization, as well as the advantages of joining.



This year, SGSA organized a **Halloween Potluck**. The atmosphere was filled with joy and camaraderie as students, faculty, and staff shared delicious dishes and engaged in activities that added more fun to the occasion. The picturesque setting of Lake Bryan provided a perfect backdrop for the gathering, creating lasting memories for all who participated in this celebration.

On August 14, 2023, the Department of Statistics hosted the **New PhD Student Mentor Program Lunch**, pairing new and current PhD students based on shared interests.

This program fosters guidance on coursework, life challenges, and community building. The accompanying lunch provided an excellent opportunity for new students to connect with mentors and peers.

The department further strengthened its commitment to a supportive environment with the **18th Annual New PhD Student Orientation**, welcoming 20 new students. The orientation, featuring a delightful lunch with faculty, facilitated interactions, and aimed to create an inclusive atmosphere for students beginning their academic journey.

The **Stata Social**, held annually at the StataCorp headquarters, offers a valuable occasion for faculty, staff, and students from the department to interact with Stata's employees.

This event serves as a networking platform, creating potential opportunities for future employment and promoting collaborations between the academic and corporate sectors.

It facilitates meaningful engagement and relationship-building among individuals from both academia and the industry.

Alan Riley, President, and Yulia Marchenko '10, Vice President of the company, joined this special event.

PH.D. WELCOME PARTY

The Ph.D. welcome party, hosted by Dr. Vidakovic, served as a fantastic platform for new and returning Ph.D. students to familiarize themselves with one another, share a meal, establish connections, and, most importantly, have a great time. The event exemplified the importance of fostering a sense of community within the academic journey, creating an environment where students could build relationships that extend beyond the confines of the classroom and contribute to a supportive and collaborative academic experience.

ARTSCI HOWDY WEEK

Howdy Week is a vibrant and inclusive tradition, serving as the official welcome for both new and returning students in the days leading up to the start of each semester.

As part of this enthusiastic effort, Statistics Student Ambassadors actively engaged with incoming students, extending a warm welcome and fostering interactions to ensure a smooth transition into the Aggie community. Their commitment to creating a welcoming environment mirrors the overarching spirit of Howdy Week, where every Aggie is encouraged to embrace the opportunities and experiences awaiting them in the upcoming academic year.

ALICIA CARRIQUIRY
NAMED 2023-24 HAGLER FELLOW

The Hagler Institute for Advanced Study at Texas A&M University meticulously selects Hagler Fellows from among distinguished scholars who have achieved notable professional success or received significant recognition.

This year, Alicia Carriquiry, a Distinguished Professor and the holder of the President's Chair in Statistics, as well as the Director of the Center for Statistics and Applications in Forensic Evidence at Iowa State University, was appointed as a Hagler Fellow at the Hagler Institute for Advanced Study.

She joins the esteemed 2023-24 Fellows and Distinguished Lecturers class, expressing her appreciation for being chosen "There was no personal reason to select me. I was chosen based on my professional accomplishments, so that's quite meaningful."

Carriquiry's impressive list of accolades includes membership in the National Academy of Medicine and various awards in statistical societies.

"The list of scholars invited to the Hagler Institute of Advanced Studies is very impressive," Carriquiry mentioned. "I'm in awe to be in the company of these individuals. It's honestly quite humbling and flattering." Notably, current Hagler Fellows include members or fellows of prestigious scientific or professional academies worldwide.

By attracting distinguished individuals like Carriquiry, The Hagler Institute for Advanced Study elevates the national and global reputation of Texas A&M University. Additionally, it plays a crucial role in retaining outstanding faculty researchers while also attracting high-quality faculty members and students.

Carriquiry will collaborate with faculty, researchers, and students in the College of Arts and Sciences.

DECEMBER 2023
GRADUATES

UNDERGRADUATE STUDENTS

Nihar N. Degaonkar | Catherine Nguyen Minh Duong | Emma Carolyn Jipp | Hajune Kim | Michael Andrew Potter | Grant Jeffrey Tober | Stanley J. Yang | Dylan Andrew Rollins

MS ON-CAMPUS STUDENTS

Griffin Wagenknecht | Melanie Rose Chida | Jenny Gong | Phillip Lance Reynolds | Siddhanth Reddy Sirgapoor

MS DISTANCE STUDENTS

Seth Abels | Julia Alaethia Berry | Jiajun Chen | Monica Daniel | Peter Robert Dimler | Verginia Mae Lijie Dole | Robert Louis Florich | Jaime Anne Goode | Casey Curtis Hannan | Myriam Ariadna Jimenez | Chun Wing Lam | Mathew James Lech | Gitika Narang | Samuel Isaac Newman | Kimberly Nguyen | Jisook Park | Jeffrey Rauenbuehler | Odessa C. Reyno | Kathy Xuan Trieu | Suhong Wu | Fei Yue | Dongyue Zhou | Michul Kang

PHD STUDENTS

Bowen Lei

UPCOMING EVENTS

16 FEBRUARY	11:30-12:20 p.m.	Colloquium: Jianqing Fan
23 FEBRUARY	11:30-12:20 p.m.	Colloquium: Tracey Ke
21 MARCH	1:00-2:00 p.m.	SFSN Webinar: Mandy Hering
3 APRIL	11:00-12:00 p.m.	SFSN Webinar: Dennis King
1 MAY	11:00-12:00 p.m.	SFSN Webinar: John Schwenck
23-24 MAY	All Day	Dr. Raymond Carroll's 75th Anniversary Conference

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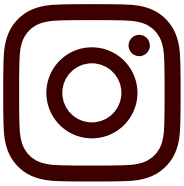
FOLLOW US ON SOCIAL MEDIA

 @tamustats

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CONTACT

Department of Statistics
3143 TAMU
College Station, TX 77843-3143

(979) 845-3141
statlinks@stat.tamu.edu

www.stat.tamu.edu