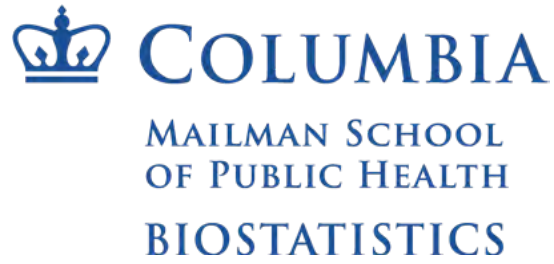


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2022 Newsletter

Significant Moments





ACKNOWLEDGEMENTS

The many contributors to “Significant Moments” include members of the Department of Biostatistics Communications Committee (Seamus Thompson, Linda Valeri, Corey Adams, Cheng-Shiun Liu, Caleb Miles, Melanie Wall, Prakash Gorroochurn); the Department Administration (Justine Herrera, Katy Hardy, Anthony Guerrero, Erin Elliott); the Mailman School Communications Office (Vanita Gowda, Anne Foulke); other Biostatistics faculty members (Kiros Berhane, Todd Ogden, Shing Lee, Qixuan Chen, Jeff Goldsmith, Min Qian, Ying Wei, Yifei Sun); current graduate students (Amy Pitts, Waveley Qiu, Rebecca Silva); recent PhDs (Angel Garcia de la Garza); and others (Nina Orwitz, Kam-Cheng Tchou-Wong).





NEWSLETTER 2022

TABLE OF CONTENTS

INTRODUCTION

[Letter from the Chair](#) 4

EDUCATION

[Education News](#) 6
[Student Data](#) 7
[BEST Program](#) 8
[SIBDS Summer Institute](#) 9
[Computing Club](#) 10
[Graduate Student Research Seminars](#) 11

RESEARCH

[Research News](#) 12
[2nd Data Science Summit](#) 14
[International Data Science Training Program](#) 16

NEW FACULTY

[New Faculty](#) 18

DEPARTMENTAL RETREAT

[Overview](#) 20

AWARDS

[Faculty, Student & Staff Awards](#) 21

SPOTLIGHTS

[Faculty, Student & Staff](#) 22

GRANTS

[Overview](#) 28

PUBLICATIONS

[Faculty Publications 2022](#) 31

BIOSTATISTICS DEPARTMENT

LETTER FROM THE CHAIR

Dr. Kiros Berhane



Dear Biostatistics Community

My warmest greetings to all members and friends of Columbia Biostatistics! It is with immense pride in our accomplishments so far and great enthusiasm for what the future holds for our department that we share our latest departmental newsletter – “Significant Moments”. In addition to the increasing vibrancy of our community as we get back fully in-person post the COVID-19 Pandemic, the past year has been one of many accomplishments and thoughtful strategic planning. I am proud to say that the department has continued to thrive with high levels of productivity and visibility. This issue highlights several, but not all, of the accomplishments of the department’s faculty, trainees, and dedicated staff members.

Our educational offerings range from NIH funded pipeline programs to a wide array of graduate programs at the master's and doctoral levels - spanning both domestic and international programs. Our pipeline programs expanded with the addition of a new NIH funded program entitled “Summer Institute for Biostatistics and Data Science at Columbia [“SIBDS@Columbia”] – a program that the department used to have in the past and reclaimed with this new grant. I will co-lead this program with Dr. Christine Mauro. SIBDS@Columbia complements our other NIH (and Columbia) funded flagship and pioneering Biostatistics and Epidemiology Summer Training (BEST) program, which focuses exclusively on trainees from underrepresented groups, by increasing the number of trainees and additionally prioritizing health data science. This past summer, we hosted 14 and 11 trainees in the BEST and SIBDS@Columbia programs, respectively, hailing from universities across the nation. On other fronts, the professional development of our graduate students and postdoctoral fellows is enhanced via vibrant student programs such as the Computing Club and Graduate Student Research Seminars. Our graduating MS and MPH students participated in a day-long Practicum Symposium with sessions chaired by our PhD students—a resounding success thanks to superb organization by our MS Programs Director, Prof. Qixuan Chen! As part of our NIH-Fogarty funded APHREA-DST grant that I lead as a Principal Investigator, we had the privilege of hosting six visitors (two fellow principal investigators and four Faculty Scholars) from our partner institutions, University of Nairobi (Kenya) and Addis Ababa University (Ethiopia)– extending our outreach to the global level.

On the research front, our department has continued to produce high-quality peer-reviewed publications in innovative new methodologic approaches and state-of-the-art collaborative interdisciplinary research. Our research activities are funded by an ever-increasing federally funded portfolio. Its reach continues to cover every corner of CUIMC's research enterprise and beyond. The department has been taking significant bold steps toward asserting leadership in public health data science at Columbia and beyond. A second Public Health Data Science Summit is being organized at the school level (for January 12-13, 2023) with critical leadership and input from our department. Both Dr. Jeff Goldsmith and I are working with Vice Dean Gary Miller to organize the summit, and several members of our faculty will lead and participate in key panels. We encourage all of you to sign up and participate in this exciting and forward-looking summit. This summit is particularly important as it is being held during our MSPH Centennial Celebration year at a time when the future of our field continues to be reshaped and remolded with the infusion of data science innovations and principles.

We are very proud to announce that four outstanding new faculty have joined our growing faculty—please see their full profiles in this issue—adding strengths in critical and forward-looking areas of expertise. We also had the bittersweet moment of bidding farewell to two outstanding and long-serving faculty members (Professors Wei Yann Tsai and Xinhua Liu) in a well-attended farewell ceremony. Both Professors Tsai and Liu will continue to be part of our community as Emeritus Faculty. We will continue to add several new faculty hires over the next few years, according to our strategic planning.

One important activity that the department undertook this past year was the day-long retreat, held on September 1, 2022. This was conducted after long preparations and planning (with a planning committee co-chaired by Profs. Ying Wei and Tod Ogden), and covered a deep discussion on a wide-ranging host of issues around the educational and research-related activities. The main goal of this retreat was to assess the current status of the department and chart ways forward to overcome any existing challenges and to better position the department as a leader in our field. We are now following up on the recommendations and acting on prioritized implementations.

Throughout this issue, you will find synopses on departmental activities, spotlights on our outstanding staff; profiles on our trailblazing faculty; and details on activities by our award-winning talented students and distinguished alumni who are making significant contributions to biomedical research and education through their quantitative skills. We hope that this issue will give you a good sense of how the department is continuing to fulfill its academic mission and also planning for its even brighter future.

I feel very proud and privileged to continue leading such a world-class department. I gratefully acknowledge the superb support from Columbia Mailman and CUIMC leadership, and the collegiality within the department that assures a cultivating, nurturing, and inviting environment for all its members. Given Mailman's commitment to creating a truly anti-racist environment (as enshrined in its FORWARD initiative—for which I have the privilege of co-leading its accountability cabinet starting this Fall), I will continue to work with all department members and beyond to make sure the department's excellence goes beyond its core academic mission, and includes its dedication to creating a truly anti-racist working and learning environment and to being on the leading edge of working towards a healthy world. Finally, I want to express deep appreciation and gratefulness to the many devoted and passionate supporters of our mission—including the Sanford Bolton Estate, the family of Roslyn and Leslie Goldstein, and the family of Cynthia and Robert Citron. As always, I close by inviting all of you to remain engaged with the department. We hope to have the privilege of hosting you as visitors to share your knowledge and wisdom and, hopefully, as potential collaborators, new colleagues and/or future trainees at all levels.

DR. KIROS BERHANE

Chairman of the Department of Biostatistics



EDUCATION NEWS

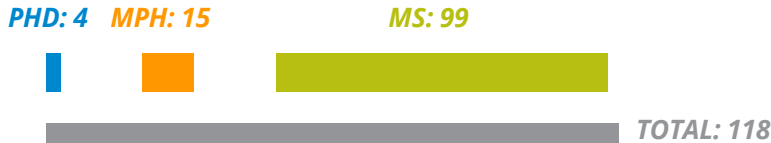
Todd Ogden, Professor of Biostatistics

In the fall of 2021, the Department of Biostatistics launched its newest major educational innovation: the [Public Health Data Science Track](#) for the MS in Biostatistics program. This program combines more traditional training in biostatistical theory, methods, and applications with principles of statistical learning and principles of data management. We are set to graduate our first cohort in the spring of 2023. Despite it being a new program, it has already become our second most popular MS track, with 51 students currently in their second year and 40 students now in their first year.

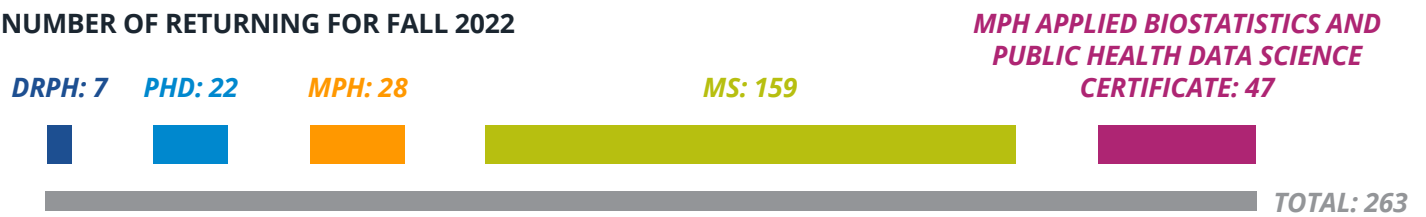
We are also proud to announce the launch of our [Summer Institute for Training in Biostatistics and Data Science at Columbia \(SIBDS@Columbia\)](#), which began in the summer of 2022. This initiative—supported by the National Heart, Lung, and led by Department Chair Kiros Berhane and Professor Christine Mauro—recruits promising undergraduate students with diverse backgrounds nationally, who then spend seven weeks together on Columbia’s campus. This program runs synergistically with our department’s long-running [BEST \(Biostatistics and Epidemiology Summer Training\) Diversity Program](#). The SIBDS program involves the training of participants in fundamental concepts of biostatistics and data science, computing skills, and hands-on biomedical data analysis. During the program, they work closely with faculty mentors on research projects, and then in the last week of the program they present their results in a poster session. In its first year, SIBDS@Columbia hosted eleven students from all over the country. We appreciate the efforts of all who participated in the program, with special thanks to Biostatistical faculty mentors Dan Malinsky, Qixuan Chen, Caleb Miles, Ying Wei, and Yifei Sun.

DEPARTMENT DATA STUDENTS

NUMBER OF 2022 GRADUATES (INCLUDING FEBRUARY 2022 AND OCTOBER 2021)



NUMBER OF RETURNING FOR FALL 2022



NUMBER OF INCOMING FOR FALL 2022



WHERE OUR 2022 GRADUATES ARE PURSUING A DOCTORAL DEGREE:

 PhD, Biostatistics, Columbia University	 PhD, Electronic & Computer Engineering, Hong Kong University of Science and Technology
 PhD, Biostatistics, Vanderbilt University	 PhD, Public Health Genetics, University of Washington
 PhD, Computational Biology, Northwestern University	

WHERE OUR 2022 GRADUATES HAVE FOUND JOBS:

Albert Einstein College of Medicine	Health Services Advisory Group	Precisely
Analysis Group	IQVIA	Tempus Labs
Athenahealth	Johns Hopkins University	The Dermatology Specialists
BD	Lumenis	The Rockefeller University
Boehringer Ingelheim	Mailman School of Public Health	TriNetX
Bristol Myers Squibb	Medidata Solutions	University of Pennsylvania School of Medicine
Cleveland Clinic	Memorial Sloan Kettering Cancer Center	Walmart Global Tech
Columbia University Irving Medical Center	Michael Allan Company	Weill Cornell Medicine
Cytel	Mount Sinai/Icahn School of Medicine	
DermBiont	Novartis	
EDETEK	NYU Langone	
Eli Lilly	Precision for Medicine	



BIostatistics EPIDEMIOLOGY SUMMER TRAINING **(BEST) DIVERSITY PROGRAM**

BEST: 14 STUDENTS



Each summer, a highly selective group of undergraduates from across the country attend classes in introductory biostatistics and statistical computing, and are engaged in research under the supervision of a faculty

SCHOOLS THEY CAME FROM:

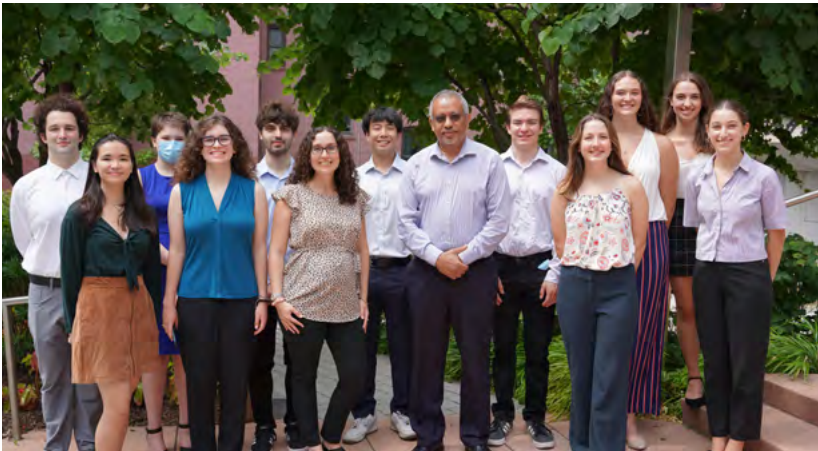
-  Agnes Scott College
-  Allegheny College
-  Carnegie Mellon University
-  Mt. Holyoke College
-  Oxnard College
-  Pennsylvania State University
-  Pomona College
-  Santiago Canyon College
-  Tufts University
-  UC-Davis
-  University of Buffalo
-  University of Florida
-  University of Maryland – Baltimore County

RESEARCH PROJECTS:

- Examining the Relationship Between Intimate Partner Violence and Psychological Distress in Refugee Women within Tanzania
- Personal Care Product Use in a Diverse Sample: A Pilot Study
- The Complex Maternal Immune Environment and Its Relationship with Fetal Growth
- Understanding the Relationship Between Energy Insecurity and Health: A First Look at the Energy, Equity, Housing & Health (E2H2) Survey
- Sleep Factors Contributing to Burnout and High Blood Pressure in Emergency Department Clinicians
- Analyzing Adolescent Substance Use from ABCD study
- Association between COVID-19 Infection and Smoking and Drinking Behavior Among Older Adults

SUMMER INSTITUTE FOR TRAINING IN BIOSTATISTICS AND DATA SCIENCE (SIBDS) PROGRAM

SIBDS: 11 STUDENTS



This innovative, hybrid summer training program introduces fundamental principles of biostatistics and data science to promising undergraduate students. Students are engaged in research under the supervision of a faculty member.

SCHOOLS THEY CAME FROM:

-  Amherst College
-  Bryn Mawr College
-  Carnegie Mellon University
-  Colorado State University
-  Georgetown University
-  Marist College
-  Northwestern University
-  Saint Louis University
-  UC-Davis
-  UMass-Dartmouth
-  University of Illinois-Urbana Champaign

RESEARCH PROJECTS:

- Detecting Causal Relationships Among Synaptic Proteins in Patients with Dementia
- Impact assessment of expanded access to HIV treatment in Lesotho between 2014 and 2016 using integrated data from multiple surveys and scraped data
- Testing Antipsychotic Medications for Patients with Schizophrenia: Olanzapine vs Perphenazine
- Preparing Data for an Investigation of Preterm Birth
- Uncovering the Relationship Between Maximum Speed and Year of Occurrence in Hurricanes in the North Atlantic Region between 1950 and 2000
- Predicting Time to COPD with Survival Analysis Techniques



BIostatISTICS COMPUTING CLUB

Course Hex Stickers designed by Anjile An

The Columbia Biostatistics Computing Club hosts seminars focusing on computational topics often encountered in biostatistics research. These sessions provide hands-on learning at various skill levels, bringing new students up to speed and addressing more advanced problems with others. A graduate student volunteer runs each session and prepares tutorials on topics of interest, including R, LaTeX, and Python.

In the past, we have hosted monthly meetings on a wide range of topics, including the terminal and R packages, such as ggplot, gtsummary, and Shiny. This year we are excited to be holding our meetings in person with an asynchronous zoom option.

In addition to past sessions on LaTeX and how to set up your computer as a statistician, we plan to offer new sessions on SQL, package development in R, and Beamer presentations. We will also collaborate with the Columbia Mailman School's Causal Inference Learning Group and the Career China Club.

Our overarching goal is to teach students valuable skills in their research and their work in the industry. We hope our meetings encourage students to interact with each other and to build a community outside of coursework. This year's organizers are Charlotte Fowler, Amy Pitts, Safiya Sirota, and Ziyi Wang.

More information about our activities and past resources can be found on [our website](#).



GRADUATE STUDENT RESEARCH SEMINARS (**GSRS**)

GSRS is a monthly event for current doctoral students of the Biostatistics department to practice presenting their work in front of their peers and to discuss the milestones to getting a PhD while sharing advice. This fall we held a “Professor Talks” meeting, where GSRS opens to faculty of the department, allowing professors to provide an overview of their research and highlight opportunities for students to engage with them in their work. This event has been very successful in the past and gives students the opportunity to network with faculty for research opportunities.

We also held a panel on summer internships where doctoral students discussed their own internship experiences and the application process in a broad range of industries including Google, Johnson & Johnson, Morgan Stanley, and the U.S. Food and Drug Administration. Coming up for GSRS, there will be a Q&A discussion about the Oral Comprehensive Exam where students can engage with those who have previously completed their Exam, and obtain advice on how to prepare for it, and what to expect. Students will also be able to give brief talks about their current work in our upcoming Research Speed Talks meetings. Lastly, GSRS will hold dissertation practice talks this fall and spring, in which one student presents their work ahead of their dissertation.



RESEARCH NEWS

The Department of Biostatistics has continued its tradition of strong methodological and collaborative research in 2022. Collectively, Biostatistics faculty have published more than 425 papers in high-profile journals in biostatistics, public health and medicine. We received five new methodological awards as PI and MPs, bringing the total number of on-going biostatistics research grants to twenty six. Biostatistics faculty also collaborated on 136 grants in public health and medicine as co-investigators. To accelerate and further motivate the generation of federally funded cutting-edge methodology grants, we have instituted a new internal grant mechanism for grant writing. In its inaugural year, the program has funded two pilot grants to groups led by Dr. Jeff Goldsmith and Dr. Yifei Sun. Several issues related to the department's research mission were discussed at our department's day-long retreat on September, 2022, giving rise to a list of areas that need attention. A number of working groups are currently deliberating on prioritizing the many recommendations with aim towards tangible action.

Thanks to the great efforts of the recruitment committee led by Drs. Zhezhen Jin and Jeff Goldsmith, one of the most memorable achievements of the year 2022 has been the successful recruitment of four amazingly talented faculty members, Drs. Wenpin Hou, Molei Liu, Zhonghua Liu, and Xiao Wu. Their cutting-edge research energizes the department and opens new front lines in our research and collaborations. All except for Dr. Xiao Wu, who will join us in January 2023, have already joined us over the summer.

In the past year, Dr. Wenpin Hou developed several innovative analytical tools for single-cell spatial transcriptomics, from computation to visualization. Single-cell spatial transcriptomics is a new ground-breaking molecular profiling technique that allows scientists to measure all the gene activities in a tissue at the single-cell resolution and map out the spatial locations of those activities. Its promise for future biology and human health can only be fully realized with proper analytical tools. Dr. Hou's well-rounded analytical framework delivers one solution.

Dr. Zhonghua Liu and his co-authors recently developed a new robust Mendelian randomization method called MR MiSTERI by leveraging phenotypic variance to identify a causal effect correctly. Mendelian randomization uses genetic profiles as instrumental variables. It is a widely used approach to overcome a major limitation of observational studies: unmeasured confounding. Dr. Liu's MR MiSTERI is powerful, flexible, and robust to

the violations of traditional core assumptions. As a result, it can broadly empower the use of modern biobank databases for scientific discoveries and evaluation of interventions. Key targets include the UK biobank, the All of US research program, and many institutional-level biobanks.

With the advances in cloud computing, data collection on all fronts and storage in different geographic locations can now be accessible to researchers. Dr. Liu has developed several practical tools which enable the analysis of such connected data in a federated and distributed fashion, and have attracted considerable attention. One of his recent contributions is a distilled conditional randomization test (dCRT), which allows the use of a wide range of state-of-the-art machine learning algorithms to test for conditional independence. This methodological breakthrough has great potential for scientific discovery and facilitates causal inference with complex machine-learning methods on large data sets.

Dr. Xiao Wu dedicates his methodological research to addressing urgent health research needs in the context of the environment and climate change. One such example is a new generalized propensity score approach which he developed last year to facilitate causal inference for continuous exposures. This new method fills a gap in the existing causal inference literature and can promote awareness of causal inference in future science and policy-relevant research in environmental and climate studies, where interventions and exposures are naturally continuous.

Recruiting new talent is one of the department's main tasks in building strong, modern, and connected biostatistics and health data science research. In the coming years, we will continue to lead methodological advances in systematic learning from large-scale and connected data resources for scientific discoveries and precision invention learning. We will build more bridges to connect with informatics, computer science, and engineering, and to promote the core values of statistical rigor, principles, and reasoning in advancing health data science. We will also continue to strengthen the connections among our efforts in research, education, and training, to accelerate knowledge transfer to empower future biostatisticians and the healthcare workforce generally. And finally, and crucially, we will enhance our connections with underrepresented and underprivileged communities, using modern data science approaches to mitigate health disparities and promote health for all. With these features in mind, we look forward to another exciting and productive year of research in 2023.



2ND DATA SCIENCE SUMMIT

The Mailman School of Public Health hosted an in-person Data Science for Public Health Summit on January 13, 2023. The evening before featured a Distinguished Lecture in Data Science, given by Dr. Sherri Rose of Stanford University. The Summit began with a morning Keynote address from Dr. Xihong Lin of Harvard University and continued with three sessions focusing on the following important topics: (1) Research Infrastructure for Data Science in Public Health Research, (2) Education in Data Science in Public Health, and (3) Ethics in Data Science and Public Health Challenges.

The purpose of this gathering is to identify the data science challenges that are unique to public health, so that we can design and develop training and research programs that exploit the power of data science for the betterment of human health. More specifically, it is expected that the deliberations will help in shaping Mailman's and Columbia's strategic actions towards establishing global leadership in public health data science research, training and ethical practice.

Below is an article summarizing the event

“

DATA SCIENCE SUMMIT LOOKS TO THE FUTURE OF PUBLIC HEALTH

January 23, 2023

”

Over the past year, AI tools like ChatGPT and DALL-E have made headlines for their ability to generate text and images in powerful new ways. Meanwhile, public health data scientists are increasingly harnessing advanced analytic methods like AI, with major implications for the future of the field.

A daylong Data Science for Public Health Summit at Columbia University Mailman School of Public Health examined the critical and growing importance of emerging analytic tools, from machine learning and natural language processing to network science, dynamic modeling, and data visualization. Participants included faculty from across Columbia Irving Medical Center and the larger university, including representatives from Columbia's Data Science Institute.

The goal of the summit was to assess the field of data science for health, including both its current status and future trends, alongside a thorough assessment of how Columbia could structure its research and training activities to be at the vanguard of the discipline.

Guest speakers and panel discussions covered topics, including approaches to training the next generation in data science in public health, ethical issues in data science, and practical considerations around the infrastructure for data science research. Like the first Data Science for Public Health Summit in early 2020, the 2023 summit was organized and moderated by Gary Miller, Vice Dean for Research Strategy and Innovation and professor of Environmental Health Sciences—together with Kiros Berhane, chair of Biostatistics, and Jeff Goldsmith, associate professor of Biostatistics.

In opening remarks, Dean Linda P. Fried said data science will play a key role in addressing critical public health challenges in the coming years. “The complexity of the challenges we’re confronted with demand we look at the methods and the capabilities we as a field bring to the future of health,” she said. “Schools and programs of public health have to become facile in the wide range of tools and techniques that fall under the data sciences.”

The Dean observed that data science has the potential for both good and bad, with the latter including the potential to exacerbate health disparities. As a field, she said, public health needs to create training and research programs that prevent these missteps and create safeguards for every sector to use.

Jeannette M. Wing, executive vice president for research at Columbia University and formerly the director of the Data Science Institute, said the rapidly growing collection of data, combined with our ability to analyze it is putting new demands on data science infrastructure. Wing said her “big goal” is to centralize high-performance computing infrastructure at the university, providing the computing power and storage to support data science, including “high-end AI applications, scientific computing, and gobs and gobs of data.” She solicited input on this plan, encouraging faculty to dream big about what they might do with the right tools and infrastructure.

Xihong Lin, a biostatistician on the faculty of Harvard T. H. Chan School of Public Health, delivered a keynote address that reflected on lessons learned from conducting and communicating research on the COVID-19 pandemic. Among these lessons was the need for data scientists to “step in early and learn on the fly.” Pre-print publications and real-time dashboards provided actionable information in a fast-moving situation. Another important lesson: media training to help scientists communicate with journalists.

AN EYE TO ETHICS

Summit speakers and panelists shined a light on the need for ethical guidelines in data science. As one example of an ethical lapse, an algorithm used by hospitals was found to discriminate against Black people (link is external and opens in a new window) by not referring them to care in the same way it did for White people.

In a distinguished lecture on the eve of the summit, Sherri Rose, a professor of health policy and co-director of the Health Policy Data Science Lab at Stanford University, said ethics, fairness, and health equity should all be considerations for AI tools, all of which should be individually assessed for whether or not they exacerbate harms to minoritized groups. Rose went on to describe her own research which uses AI to reduce inequities in health insurers’ use of risk adjustment formulas. Done right, Rose said AI “could more frequently be contributing to improving health equity rather than harming it.”

In a related panel discussion, Gary Miller said the Columbia Mailman School can take a lead in teaching students in ethical data science before they take jobs in health care technology. “We can start by infusing our values in the people trained at the university,” he said.



INTERNATIONAL DATA SCIENCE TRAINING PROGRAM **APHREA-DST**

NIH Funded

The department hosted a team of six partners (August 29 – September 2, 2022) from its NIH funded international Data Science training program – the “Advancing Public Health Research in Eastern Africa through Data Science Training” (APHREA-DST). Launched in 2021 as part of the NIH’s NIH Common Fund’s and as part of the “Harnessing Data Science for Health Discovery and Innovation in Africa,” (DS-I Africa), APHREA-DST works to accelerate public health research and impact by establishing new multi-tiered training programs in public health data science in Eastern Africa. It is a partnership between Columbia University, Addis Ababa University (AAU, Ethiopia), and the University of Nairobi (UoN, Kenya). Prof. Kiros Berhane, Chair of Columbia’s Department of Biostatistics is Contact PI for the project.

Additional faculty and bridging support for the project are provided by the Mailman School of Public Health (Environmental Health, Epidemiology, and ICAP in addition to Biostatistics), Lamont-Doherty Earth Observatory, Data Science Institute, Department of Statistics, and School of Engineering.

The visiting team included six members. Two are principal investigators (MPIs): Dr. Rahel Bekele from AAU and Prof. Patrick Weke from UofN. The other four are the members of the inaugural cohort of faculty scholars under APHREA-DST's Faculty Development program, namely Drs. Wondwossen Mulugeta and Getachew Hailemariam from AAU, and Drs. Idah Orowe and Elisha Abade from UofN. During the visit, the faculty scholars spent several sessions with their Columbia Mentors, Dr. Jeff Goldsmith and Dr. Tiffany Sanchez, as well as with Prof. Kiros Berhane, who served as the third PI mentor.

APHREA-DST Project Director Dr. Isabelle Zaugg, in partnership with project partners, also organized a series of visits with faculty and supporting institutions across campus. A "Meet & Greet" luncheon including APHREA-DST's Columbia investigators and MSPH department chairs kicked off the week. The visiting scholars met with Dean Linda Fried and other MSPH Deans to discuss priorities in public health research at Columbia and at their home institutions in Eastern Africa. Dr. Dan Westervelt organized a joint research symposium at Lamont-Doherty Campus in which a mix of Faculty Scholars and Columbia researchers presented recent research projects. Prof. Tian Zheng, Chair of the Department of Statistics, hosted the group for a lunch and discussion about innovative training ideas. The Data Science Institute welcomed the group for an introduction to their cross-disciplinary data science work, with a particular focus on the Center for Health Analytics; the visiting PIs also shared a snapshot of their university's history and work on data science-related activities. The visiting scholars participated in the closing dinner of the Department of Biostatistics annual retreat, mingling with faculty, administration, and postdoctoral fellows. A half-day seminar was held at the School of Nursing, led by Prof. Suzanne Bakken and colleagues, who shared varied research and applied projects at the intersection of data science and nursing practice. Prof. Pam Factor-Litvak organized a fruitful roundtable discussion with Epidemiology T32 trainees.



WELCOME NEW FACULTY

We have had a truly outstanding year for faculty recruitment. Thanks to sustained efforts by the Faculty Recruitment Committee, co-chaired by Profs. Zhezhen Jin and Geoff Goldsmith, and exceptionally comprehensive and enthusiastic support from the entire faculty, we are proud to have successfully recruited four exceptionally talented new faculty members. We had the distinct pleasure of welcoming three of them (Drs. Wenpin Hou, Zhonghua Liu and Molei Liu) during Summer 2022 – and we provide a brief synopsis of the many areas of their expertise in this newsletter. The fourth (Dr. Xiao Wu) will be joining us in January, 2023.



WENPIN HOU

ASSISTANT PROFESSOR OF BIostatISTICS

Dr. Wenpin Hou, Assistant Professor of Biostatistics, received a PhD in Mathematics from the University of Hong Kong in 2017, and was subsequently a Postdoctoral Fellow in the Departments of Computer Science and Biostatistics at John Hopkins University. Her research focuses on developing statistical machine learning methods to tackle the challenges at the intersection of statistics and data science (data in single-cell genomics, epigenomics and spatial transcriptomics), mathematical modeling of gene regulatory networks, and ultimately understanding gene regulatory mechanisms. She is particularly interested in developing methods for spatio-temporal patterns in single-cell and spatial genomics and epigenomics data. She is also interested in collaborations in various aspects of cancer, immunology, infectious disease, developmental processes, obesity, maternal and child health, and health disparity. The outcomes here are expected to lead to uncovering the complex mechanisms of various diseases and biological contexts, and to the development of targeted therapies that can benefit the broad community.



MOLEI LIU

ASSISTANT PROFESSOR OF BIostatISTICS

Dr. Molei Liu, Assistant Professor of Biostatistics, has a PhD in Biostatistics from Harvard University. He has strong training and early trajectory in several innovative areas of methodologic research including high dimensional statistics, federated learning, distributed learning, transfer learning, semi-supervised learning, semi-parametric statistical methods and theory, and also methods related to electronic health record (EHR) data analysis. He also works on electronic health record and biobank data analysis. He has already established a strong relationship with the relevant units at Columbia University such as the Department of Biomedical Informatics.



ZHONGHUA LIU

ASSISTANT PROFESSOR OF BIostatISTICS

Dr. Zhonghua Liu, Assistant Professor of Biostatistics, received his doctorate in biostatistics from Harvard University in 2015. He joined our faculty after spending a few years as a faculty member at the University of Hong Kong. His current research interests are in several innovative areas of methodologic research including those in statistical genetics/genomics, epigenetics, various areas at the interface between causal Inference and genomics/genetics, semiparametric efficiency theory, causal mediation analysis for integrative genomics and fairness, missing data problems, measurement error, and machine learning methods. In addition, he has wide-ranging interests in domain area applications beyond genetics/genomics that also include Environmental health, diabetes, obesity, cardiovascular diseases, and cancer.



XIAO WU

ASSISTANT PROFESSOR OF BIostatISTICS

Dr. Xiao Wu, Assistant Professor of Biostatistics, has a PhD in Biostatistics from Harvard University and just completed a postdoctoral fellowship at Stanford University before joining us at Columbia in January 2023. Xiao's current areas of expertise include development of statistical and causal inference methods to handle complex large spatio-temporal data and their applications to broad areas of climate science and environmental health. As a typical example, he has been conducting methodologic research on causal inference that ranges from optimally balanced matching for continuous exposures to stochastic intervention and spillover effects for spatio-temporal data. Xiao's research areas will be highly relevant to Mailman's Climate and Health program and activities in Columbia's new Climate School.

Wenpin, Zhonghua, and Molei have already been extremely active. They are contributing to major research projects and have already formed many collaborations in the department. (See the Research section.) They add great strength to our department, and we are proud to have them as colleagues.

Going forward, we are committed to maintaining the vigorous recruitment methods that have produced such exciting results. Our efforts for next year are in full swing.



DEPARTMENTAL RETREAT OVERVIEW

After extensive preparation by a Planning Committee co-chaired by Profs. Ying Wei and Todd Ogden, our entire departmental faculty and key staff members conducted an in-depth discussion on September 1, 2022, about the current state of affairs in all major areas and deliberated on ways forward for the department. This retreat was well attended. Its particular goals were to assess comprehensively where we are as a department, to chart ways to overcome any existing challenges, and to better position the department as a leader in our field. A dinner reception at the end of the retreat provided a most welcome opportunity to network and reconnect with each other. Based on core areas of focus that were identified at the end of the retreat, seven working groups (with faculty Chairs in parentheses) were established to

1. Distinguish between the PHDS (Public Health Data Science) and the TM (Theory and Methods) tracks (Profs. Yifei Sun, Min Qian)
2. Improve the quality of Core/Required courses and teaching support (Prof. Todd Ogden)
3. MS advising and Practicum Project and student support (Profs. Qixuan Chen, Caleb Miles)
4. Ph.D program (Prof. Jeff Goldsmith)
5. Research Resource and Support (Prof. Ying Wei)
6. Revisit Incentive policy (Prof. Kiros Berhane)
7. Collaboration Models (Prof. Shing Lee)

After these Working Groups report back to the faculty by early 2023, the Retreat Planning Committee will regroup and identify priorities for implementation.

AWARDS

Faculty, Staff, and Student Awards

FACULTY AWARDS

CHRISTINE MAURO

Christine Mauro, Assistant Professor of Biostatistics, has received the MSPH Core Teaching Award for “Mind-set Intervention for a Graduate-Level Biostatistics Course: Research-based Strategies to Mitigate Threats to Academic Belonging” (with Leah Hooper, MSPH Senior Director of Educational Initiatives).

CALEB MILES

Caleb Miles, Assistant Professor of Biostatistics, has received the Calderone Junior Faculty Development Award for “Integrating data from studies with heterogeneous outcomes to estimate effects of cognitive remediation therapy”. This award supports research efforts initiated by full-time junior faculty members holding appointments in one of the departments at the Mailman School.

LINDA VALERI

Linda Valeri, Assistant Professor of Biostatistics, will receive funding from the The Sanford Bolton Faculty Scholars Program, which supports distinguished assistant professors to catalyze their innovative methodological research in biostatistics and enhance its translational impact.

ZHEZHEN JIN

Zhezhen Jin, Professor of Biostatistics, has been elected to be a Fellow of the IMS (Institute of Mathematical Statistics) and an elected member of the ISI (International Statistical Institute). He has also been appointed Statistical Editor for JACC: Cardiovascular Imaging for 2022-27.

YUANJIA WANG

Yuanjia Wang, Professor of Biostatistics, has been elected to be the Section Chair of Health Policy Statistics Section of the American Statistical Association.

STUDENT AWARDS AND DEFENSES

The Sanford Bolton-John Fertig Award for a distinguished doctoral dissertation in Biostatistics

Yuan Chen, PhD, for “Statistical and Machine Learning Methods for Precision Medicine”.

The Joseph L Fleiss Memorial Prize in Biostatistics

Erin J. McDonnell, PhD, for “Dynamic graphical models and curve registration for high-dimensional time course data”.

Chair’s Awards for Outstanding Master’s Students in recognition of outstanding academic and research achievement in Practicum Projects

Rachel Heise, MS, for “U-Net and Autoencoder Methods for White Matter Hyperintensity Segmentation”.

Colby Lewis, MS, for “The AxialNet Autoencoder: Performing Group rs-fMRI using Nonlinear Feature ICA”.

Bin Yang, MS, for “Identifying Heterogeneity of Treatment Effect Using Causal Forest”.

Doctoral Defenses from January - December 2022

Angel Garcia de La Garza, PhD, “Functional Data Analysis and Machine Learning for High-Dimensional Structured Data”.

Bo Hu, PhD, “The Joint Modeling of Longitudinal Covariates and Censored Quantile Regression for Health Applications”.

Denise Shieh, PhD, “Functional and parametric modeling methods for PET imaging data”.

Tianchen Xu, PhD, “Statistical Methods for Learning Patients Heterogeneity and Treatment Effects to Achieve Precision Medicine”.

Yujing Yao, PhD, “Statistical Analysis of Large Scale Data with Perturbation Subsampling”.

STAFF

Columbia Mailman School of Public Health Staff Award for Excellence

Weijia Fan, MS - Weijia has been a Data Analyst since graduating from our department in 2017. She is an integral part of the consulting service of the Biostatistics, Epidemiology, and Research Design (BERD) Resource for the Irving Institute for Clinical and Translational Research.

FACULTY SPOTLIGHTS



YIFEI SUN, PHD

Assistant Professor of Biostatistics

My research merges survival analysis, semiparametric methods, and machine learning techniques, with application to complex time-to-event data commonly seen in longitudinal studies and electronic health records. The Sanford-Bolton Award allows me to devote more time to methodological development and explore more interesting research topics.

Many of my recent projects involve the interplay between longitudinal and survival data. In many studies, repeated measurements of health processes (e.g., biomarkers) are collected prior to the occurrence of an event (e.g., disease progression, death). The complex data structure poses challenges in methodological development; on the other hand, it also brings opportunities to track the evolution of disease and improve risk management.

For example, we can incorporate time-varying patient information to improve event risk prediction. To exploit the growing amount of predictor information over time, we developed a unified framework for landmark prediction using survival tree ensembles, where an updated prediction can be performed when new information becomes available. Our methods allow the landmark times to be subject-specific and triggered by an intermediate clinical event. The methods can also be extended to conduct dynamic risk prediction of multiple events, as many chronic diseases are characterized by a series of nonfatal events.

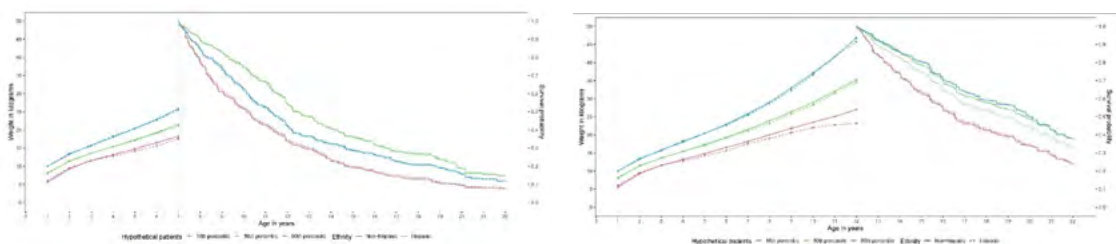
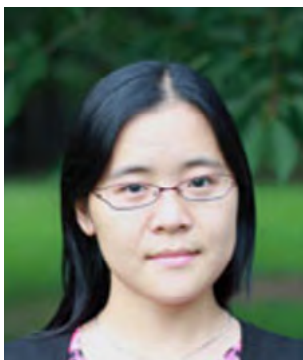


Figure: An illustration of dynamic risk prediction. Curves on the left show the repeated measurements before the landmark time for six subjects. Curves on the right show the survival predictions over the interval of interests for the corresponding groups. The upper panel is for prediction at landmark age 7. With the additional information between age 7 and 12, we can update the prediction at age 12 (rightpanel).

As another example, the longitudinal and time-to-event data also allows us to uncover the temporal changes of biomarkers prior to disease onset, and this offers insights into early diagnosis and natural disease history. Existing methods often provide an overall biomarker trajectory without explicitly accounting for the impact of the time of disease onset on the trajectory shape. However, in some applications, subjects with early disease onset may have different trajectories, such as a faster rate of decline, so a more accurate characterization of trajectories should account for the event time. We are now developing semiparametric models to capture the trends of biomarkers in multiple time scales.



QIXUAN CHEN, PHD

Associate Professor of Biostatistics, Director for MS Programs

My current research focuses on data integration, leveraging multiple data sources to provide more robust and efficient inference than using any single data source alone. My projects fall into three areas. The first focuses on combining probability and non-probability samples with population data sources. In a recent project, we utilized auxiliary information in the population to improve inference of population quantities from nonrandom samples in data-rich settings using Bayesian machine learning (Liu, Gelman, and Chen 2022). We applied the proposed method to improve generalizability, with the first application combining a telephone survey with administrative records and the second application combining data from a COVID-19 epidemiologic study with electronic health records. The second area centers on combining summary measures across multiple data sources. In another recent project, we developed a bivariate hierarchical Bayesian model for combining summary measures and their uncertainties from multiple sources, with applications in brain imaging, meta-analysis, and small area estimation (Yao, Ogden, Zeng, and Chen, 2022). Our study showed that the commonly used methods for meta-analysis can lead to biased inference when summary measures are correlated with their uncertainty measures, and that our proposed model can be used to correct the bias. The third area involves the integration of data prone to error with calibration data to correct for measurement error. An ongoing project is examining the association between exposure to indoor allergens and pediatric asthma morbidity. We utilize standards data in the immunoassay plates for measuring allergen concentrations to correct for measurement error in indoor allergens using a Bayesian general location model approach. We have also developed a constrained iterative conditional imputation approach with bootstrap inference for multiple imputation to correct for measurement error in a regression setting. This method allows leveraging two or more databases with disjoint measures in some variables due to measurement or classification error and with measurement error in exposure mixtures. We apply it in two ongoing projects; a marijuana use and homicide association study to correct for misclassification in self-reported marijuana use; and an HIV study to correct for measurement error in HIV viral load using the error-prone dry blood method.

As Director for all MS programs and Director of the Theory and Methods track, my mission is to strive for the success of our MS programs in preparing students to meet the challenges of real-world problem-solving. Our students are required to complete a research practicum to gain practical work and research experience. I am currently leading an effort to improve the practicum search, approval, and advising systems and thus enhance the quality of practicum experiences for our Master students.

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ALUMNI SPOTLIGHT



NINA ORWITZ, PHD

Principal Biostatistician, Novartis

My path since graduation in 2017 from the Columbia Biostatistics MS program has been incredibly rewarding. During my time at Mailman, while I was a summer intern at Covance, a Contract Research Organization (CRO), I first saw the importance of biostatisticians in drug development. I decided that in order to achieve success in a career in industry, I needed to continue building upon my statistical knowledge and analytical skills. After graduation, I entered the PhD program in Biostatistics in the Vilcek Institute of Graduate Biomedical Sciences at New York University. My research and eventual dissertation focused on statistical methods for personalized medicine in two areas: (1) developing novel practical and innovative approaches to measure confidence in a treatment decision made for an individual patient, with applications to mental health, and (2) developing functional data approaches to evaluate ecological momentary assessment data extracted from wearable devices. I successfully defended my dissertation in August 2021, and a few weeks later began my career in industry at Novartis.

At Novartis, I work as a principal biostatistician in the Early Development Analytics division. Primarily, I am a trial statistician for first-in-human and phase 1 trials for compounds being developed to treat patients with hematological malignancies such as leukemias and lymphomas. The role is a combination of statistical design, writing plans and protocols, and conducting and reporting analyses of clinical, pharmacokinetic, and biomarker data. I also support clinical pharmacology studies that provide critical information for drug labeling purposes. Outside of clinical trial responsibilities, I contribute as a statistical line function representative for several research initiatives looking to use and develop innovative statistical approaches to improve future oncology study designs at the company. My favorite part of the job is having the ability to strongly influence drug decision-making while collaborating with diverse cross-functional teams.

My experience at Mailman gave me both the methodological foundation necessary to succeed in obtaining my PhD and the practical knowledge that has helped me launch a career in biostatistics. The most valuable lesson I believe that I learned at Mailman, however, is to be curious, inquisitive, and to always ask questions when collaborating with others, which came from courses such as the Capstone Consulting Seminar. During my doctoral program, and now especially at Novartis in my interactions with physicians, programmers, data managers, and scientists, I have seen firsthand the value and importance of effective communication.

This fall 2022 semester, I found myself in a full circle moment when I was given the opportunity to return to the biostatistics department at Mailman as a professor for the Design of Medical Experiments course. Given the work-from-home flexibility I have with Novartis, I have been able to teach in-person once a week at Mailman. I took this course as a student and the material made a huge impact on me at the time, sparking my interest in clinical trial design and methodology. It has been invigorating to teach and give back to students at the school where my passion for biostatistics began.

PHD SPOTLIGHT



ANGEL GARCIA DE LA GARZA, PHD

Assistant Professor of Biostatistics, Albert Einstein College of Medicine

After graduating from the PhD program at Columbia in 2022, I joined the faculty at Albert Einstein College of Medicine as an Assistant Professor of Biostatistics. My collaborators at Einstein are interested in determining risk factors that influence short-term and long-term cognitive function, using data derived from wearable devices that monitor physical activity and sleep, and measure air pollution. We are analyzing these novel high-dimensional data using state-of-the-art statistical techniques to answer questions about the aging brain.

At Columbia, I worked with my dissertation advisor, Dr. Jeff Goldsmith, on developing methods for analyzing functional data. I developed a novel tool for dimension reduction to estimate activation patterns from data from a mouse's brain as it performs a reaching movement. We also worked on a novel test to compare the activation patterns derived from a range of experiments. In both projects, we aimed to help neuroscientists infer how the motor cortex drives movement from neuron-level data. The knowledge and tools I gathered at Columbia generalize to the novel datasets my collaborators at Einstein have been collecting.

I have always been passionate about mental health and cognition. While at Columbia, I worked with Dr. Melanie Wall and used machine learning methods and survey data to identify suicide risk factors. Our work, titled "Identification of Suicide Risk Factors in a National US Survey Using Machine Learning", was published in JAMA Psychiatry last year. We identify novel risk factors for non-fatal suicide attempts, including functional impairment resulting from mental disorders and socioeconomic disadvantage. I also worked with Dr. Christine Mauro and her collaborators on prolonged grief disorder. I am excited to be able to continue a similar path of research in my current role!

Outside of research, I ran the Computing Club meetings - I enjoyed learning new skills and keeping up with the newest computing tools. My favorite experience in the department was being an instructor for BEST (the Biostatistics and Epidemiology Summer Training) Diversity Program teaching Data Science and R. Although our sessions were exclusively virtual due to the pandemic, all of the students were incredibly motivated and excited to learn about Biostatistics. I immensely enjoyed my time at Columbia and the opportunities that exist at the department. I cherish the mentorship I received from all faculty and the camaraderie from my peers.

MASTERS STUDENT SPOTLIGHT



WAVERLY QIU

Masters Student Candidate

Shortly after graduating from college, I had the opportunity to spend some time working in the pharmaceutical industry as a statistical programmer for a contract research organization. It was an exciting time to have joined the company, as it had been contracted to be involved in several different COVID-19 therapeutic studies, and I was able to get involved in many studies very quickly. I enjoyed the work that I did and especially loved the people that I worked with, but as I took on more client-facing roles in the company, I could not shake the feeling that I did not have the adequate training to fully understand the studies for which I was programming deliverables. The stakes seemed too high in pharmaceuticals for me to be weak in my own theoretical foundation, and I perceived that I owed it to the industry (and the lives that are involved in the conduct and consequences of clinical trials) to be as well-trained as I could be. Pursuing graduate school became the logical solution to this problem, and I began my studies in the MS program in Biostatistics at Columbia.

I have absolutely loved being a student in this department, and this semester has probably been my favorite! In terms of coursework, I have been thoroughly enjoying the classes I am currently taking. Proof-based doctoral coursework has allowed me to continue deepening my analytical framework of thought, and I have appreciated the opportunity to consider the subject of statistics from its definitional roots. Other classes have given me the ability to view my past experiences in pharma through a clearer lens – an extended conversation in Dr. Thompson’s Randomized Controlled Trials class comes to the forefront of my mind, in which we evaluated the decision of a company I interned at to proceed to a Phase 3 trial based on a study drug’s positive effect on a surrogate outcome (and not a patient-important outcome) that may have caused the study team to be prematurely optimistic. Beyond coursework, I also have the pleasure of serving as a TA for two programming courses (Data Science 1 and Statistical Computing in SAS) this semester and am also involved in research with the Department of Environmental Health Sciences as well as with the Department of Medicine.

This program has certainly been everything I could have asked for, and more. I am thankful for the statistical maturity I have developed, the classmates whom I have had the privilege of working with, the collaborative spirit that is fostered within the department, and the examples that the faculty set as theory-driven researchers. Though I am quickly approaching the crossroads of another life transition, I believe I am well equipped – and excited! — for whatever will come next in my career.

STAFF SPOTLIGHT



JULIA THOMPSON

Data Analyst, Department of Biostatistics

Julia joined the Department in the Spring of 2021 as a Data Analyst, having graduated with a degree in biostatistics from the University of North Carolina Chapel Hill and an MS in biostatistics from our department. While Julia has been with us only for a year and a half, she has already been an integral part of many projects. She has been working with the SSTAR group on several publications investigating social and structural determinants of HIV risk in adolescents and young adults in Rakai, Uganda. Notably, she has a first-author paper in preparation on trends in orphanhood and HIV and is co-leading a project investigating COVID and pregnancy rates. She is also finalizing the protocol and statistical analysis plan for a randomized clinical trial evaluating a tailored intervention aimed at improving patient adherence to cancer and cardiovascular drugs. Her dedication and attention to detail have significantly improved the design and protocol for this study. Julia is also a member of the Biostatistics, Epidemiology and Research Design (BERD) consulting team, and in that role has helped numerous investigators with data analysis, grant writing, and study design. She joins every consult with a smile on her face and always provides valuable feedback to investigators.

In addition to being an outstanding analyst, Julia is also a talented teacher and app designer. She has been teaching an R mini-course to over 100 students and has received rave reviews and developed a user-friendly R-shiny web application to visualize survival data.

WHAT IS YOUR FAVORITE THING ABOUT WORKING IN THE BIOSTATISTICS DEPARTMENT?

My favorite thing about working in the Biostatistics Department is the people! Everyone is so passionate about what they do, and they genuinely want to be here. It makes it fun to come to work. Aside from the people, my favorite thing is the variety of projects I get to work on – I really enjoy getting a taste of many different things, especially early in my career.

WHAT IS YOUR FAVORITE OUTDOOR ACTIVITY? INDOOR ACTIVITY?

I love hiking, especially visiting national parks and getting the opportunity to do new and challenging hikes. My favorite indoor activity is trying new restaurants with friends (and watching UNC basketball games).

IF YOU COULD LEARN TO DO ANYTHING, WHAT WOULD IT BE?

I would like to learn how to make pottery. I think it's so beautiful and it would be a fun way to express my creative side. Plus, handmade pottery would make a great holiday gift for friends and family.

GRANTS

NEW GRANTS

KIROS BERHANE

2U2RTW010125-07 (Renewal) funded by The Fogarty International Center (Role: Contact PI / MPIs: Berhane, Jack, Kumie, Simane)

Award: 9/28/20215-2/28/2027

“Geohealth Hub for Research and Training in Eastern Africa – US”

This renewal application proposes to continue a progressive and tiered training program that will further develop researchers and research teams able to carry out the research agenda of the Eastern Africa GEOHealth Hub and to facilitate the translation of the research findings into impactful actions by key stakeholders. The Hub will train 6 Hub Scholars (building on 11 Hub Scholars from the first funding cycle), degree level trainees (5 PhD and 12 MS/MPH degree candidates), research team trainees across the three LMIC primary partners, and additional trainees from stakeholders as well as three more training partner countries who are all expected to become national leaders in environmental and occupational health research. The Hub will continue to train multidisciplinary research teams, develop curricular materials for academic and stakeholder institutions, and foster evidence translation and implementation with a long-range goal of establishing a sustainable Hub for the region.

1R25HL161786-01 funded by the National Heart, Lung and Blood Institute (Role: Contact PI/MPI: Christine Mauro)

Award: 01/15/2022-12/31/2026

“Summer Institute for Training in Biostatistics and Data Science at Columbia (SIBDS@Columbia)”

Technological advances are leading to unprecedented abundance of increasingly complex, voluminous, and multi-dimensional data on a wide range of health outcomes and their determinants, including those related to lung, heart, allergy, and infectious diseases—creating a critical need to train biostatisticians and data scientists with multidisciplinary skills to properly analyze such data. Also evident is the need for a diversified workforce of biostatisticians and data scientists well-versed in public health principles to properly tackle the acute and growing challenges of health disparities. To fill this critical gap, the Summer Training Institute in Biostatistics and Data Science at Columbia (SIBDS@Columbia) proposes an innovative curriculum in quantitative skills anchored on data immersion related to research challenges in studies of heart and lung diseases, as well as infectious diseases, to train the next generation of adept biostatisticians and data scientists poised to address these pressing challenges.

DANIEL MALINSKY

1K25ES034064-01 funded by The National Institute of Environmental Health Sciences (Role: PI)

Award: 08/16/2022-05/31/2027

“Flexible Causal Inference Methods for Estimating Longitudinal Effects of Air Pollution on Chronic Lung Disease”

Chronic lung diseases are among the top contributors to mortality in the United States and have previously been linked to air pollution. The proposed research will leverage advances in machine learning to develop novel statistical methods for the analysis of complex existing data on air pollution and lung disease progression over time. By combining his expertise in causal inference and machine learning with newly obtained training in air pollution science and environmental determinants of disease, Dr. Malinsky will advance the state of environmental data science and establish himself as an independent investigator in the intersection of biostatistics, machine learning, epidemiology, and environmental science.

YIFEI SUN

1R21HL156228-01A1 funded by the National Heart, Lung and Blood Institute (Role: PI)

Award: 01/03/2022-12/31/2023

“Dynamic and Personalized Prediction of Complex Cardiovascular Events”

The objective of this project is to develop novel statistical learning methods for predicting complex time-to-event outcomes such as recurrent events. The proposed methodology will have broad applicability; in particular, we aim to address the gap in predicting cardiovascular disease (CVD) recurrence by analyzing the data from the NHLBI Pooled Cohorts Study. The proposed research has the potential to advance dynamic and personalized risk prediction and to facilitate more effective prevention and treatment strategies for CVD recurrence.

WENPIN HOU

4R00HG011468-03 funded by the National Human Genome Research Institute (Role: PI)

Award:07/01/22-06/30/25

“Computational Methods for Inferring Single-cell DNA Methylation and its Spatial Landscape”

DNA methylation, an epigenetic modification that can modulate gene expression, has been shown to carry inheritable information capable of shaping phenotypes and causing many complex human diseases. In this project, leveraging the emerging technologies of spatial transcriptomics, we will identify disease-specific epigenomic signatures by developing computational and statistical methods to infer the high-resolution tissuespatial DNA methylation landscape that cannot be measured by current experimental technologies. The outcome of this project can lead to the development of new epigenetic targeted therapy and drugs for various diseases that will help the well-being of the broad community.

CONTINUING GRANTS**IULIANA IONITA-LAZA & YING WEI**

NIH/NIA (RF1AG072272) “Multi-omics approaches for gene discovery in Alzheimer’s Disease” 2021-2024 (Roles: MPls Ionita-Laza, Wei)

MIN QIAN & IAN MCKEAGUE

NSF (DMS- 2112938) “Post-Selection Inference for Survival Outcomes in Precision Medicine” 2021-2024 (Roles: MPls Qian, McKeague)

YING KUEN (KEN) CHEUNG

NIH/NHLBI (R01HL153642) “Breaking up Prolonged Sedentary Behavior to Improve Cardiometabolic Health: An Adaptive Dose-Finding Study” 2021-2026 (Role: Multi-PI, MPls Diaz, Cheung)

KIROS BERHANE

NIH/FIC (U2RTW012123) “Advancing Public Health Research in Eastern Africa through Data Science Training” 2021-2026 (APHREA-DST) (Role: Contact PI / MPls: Berhane, Bekele, Weke)

MELISSA BEGG

NIH/NHLBI (R25 HL096260), “BEST-DP: Biostatistics & Epidemiology Summer Training Diversity Program,” 2009-2024 (Role: Contact PI)

QIXUAN CHEN

NIH/NIEHS (R21ES029668), “Bayesian exposure-response analysis for immunoassays data with measurement errors” 2019-2023 (Role:PI)

YING KUEN (KEN) CHEUNG

NIH/NIMH (R01 MH109496), “Novel Methods for Evaluation and Implementation of Behavioral Intervention Technologies for Depression,” 2016-2022 (Role: PI)

CONTINUING GRANTS***JEFF GOLDSMITH***

NIH/NINDS (R01 NS097423), "Functional data analytics for kinematic assessments of motor control," 2016-2023 (Role: PI)

IULIANA IONITA-LAZA

NIH/NHGRI (R21HG012345) "Quantitative disease risk scores for common diseases, with applications to eMERGE" 2021-2023 (Role: PI)

NIH/NIMH (R01MH095797), "Novel Statistical methods for DNA Sequencing Data, and applications to Autism," 2012-2022 (Role: PI)

SHING LEE

Funded by SWOG/Hope Foundation "Analysis and visualization of adverse events and patient reported outcomes that reflect overall treatment toxicity Burden" 2020-2022 (Role: PI) 2021-2026 (Role: Multi-PI, MPIs Diaz, Cheung)

IAN MCKEAGUE

NIH/NIA (R01AG062401) "Inferential methods for functional data from wearable devices" 2019-2024 (Role:PI)

CALEB MILES

NIH/NCATS (KL2 TR001874), "Institutional Career Development Core: Clinical and Translational Science Award," 2020-2022 (Role: Career Awardee)

R. TODD OGDEN

NIH/NIBIB (R01 EB024526), "Advance Modeling Techniques for Brain Imaging Data with PET" 2017-2022 (Role: PI)

LINDA VALERI

NIH/NIMH (K01MH118477), "Statistical methods for the assessment of social engagement in psychosis using digital technologies" 2018-2023 (Role: PI)

SHUANG WANG

NIH/NLM (R01LM013061), "Big Data Methods for Comprehensive Similarity based Risk Prediction", 2019-2024 (Role: Contact PI / MPIs: Wang, Weng, Kiryluk)

YUANJIA WANG

NIH/NIMH (R01MH123487) "Machine Learning Methods for Optimizing Individualized Treatment Strategies for Precision Psychiatry" 2021-2026 (Role: PI)

NIH/NINDS (R01 NS073671), "Statistical Methods for early disease prediction and treatment strategy estimation using biomarker signature," 2011-2022 (Role: PI)

NIH/NIMH (R21MH117458) "Integrative Learning to Combine Evidence for Personalized Treatment Strategies" 2018-2021 (Role: PI)

NIH/NIGM (R01GM124104) "Efficient Statistical Learning Methods for Personalized Medicine Using Large Scale Biomedical" 2018-2022 (Role: Multi-PI / MPIs: Zeng, Wang)

YING WEI

NIH/NHGRI (R01 HG008980), "Develop Quantile Analysis Tools for Sequencing and EQTL Studies," 2016-2022 (Role: PI)

NSF DMS1953527, "Conditional Quantile Random Forest with Biomedical and Biological Applications," 2020-2023 (Role: PI)

PUBLICATIONS

Kiros Teghegne Berhane

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