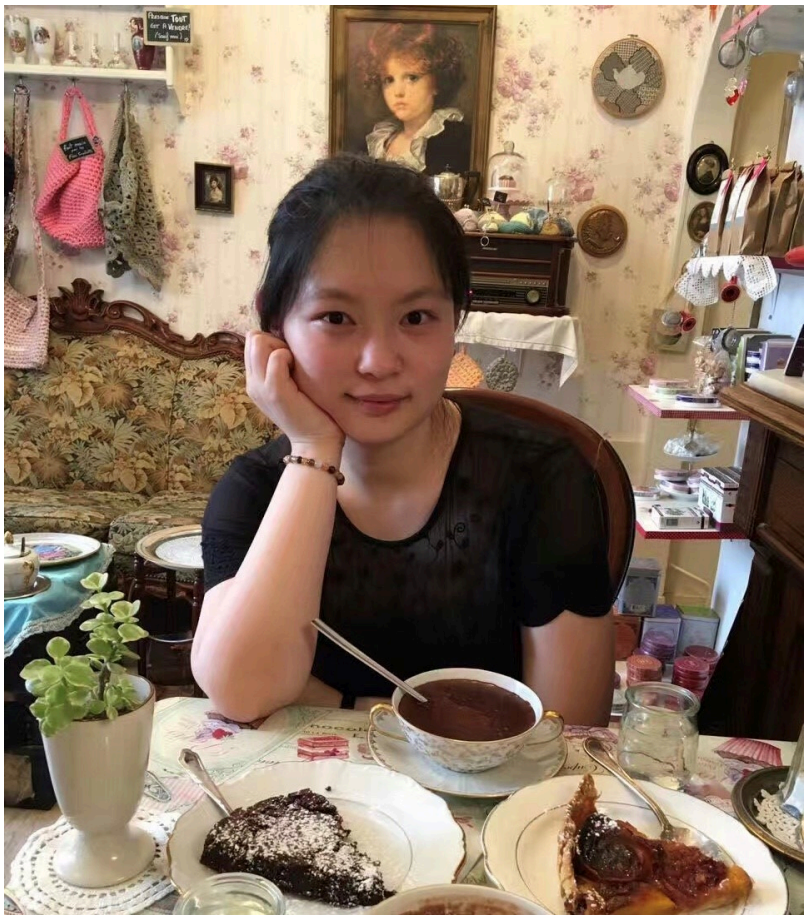
BRIDGE NEWSLETTER

BIOSTATISTICS RESEARCH & INVESTIGATION DIGEST

UTHSC MEDICINE

Welcome to our 2024 Winter Newsletter

Meet Our Newest Faculty: Yuan Zhang



Interviewed by Trish Goedecke

Dr. Yuan Zhang, Assistant Professor of Biostatistics joined our division in the fall of 2024.

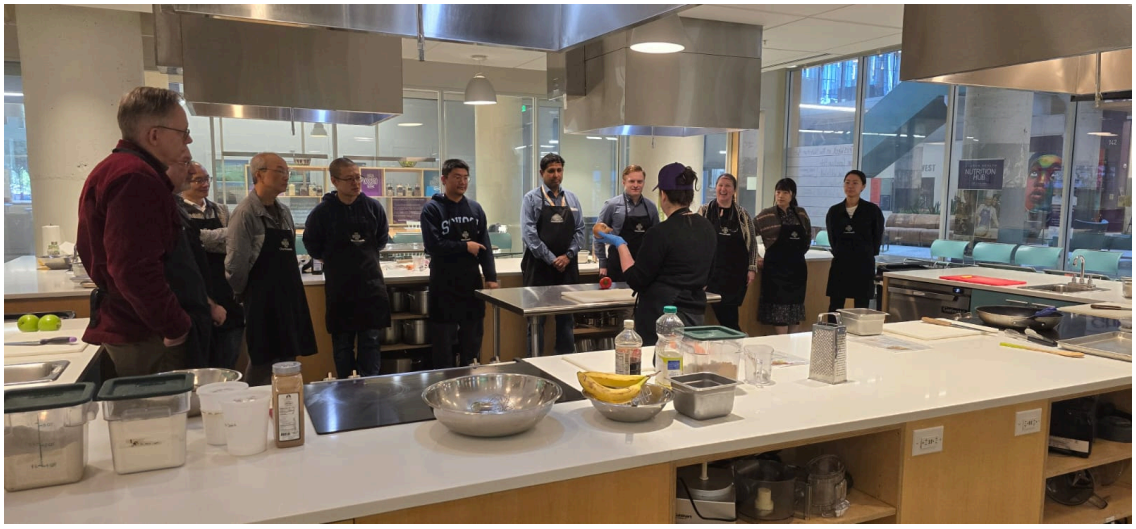
Dr. Yuan Zhang, the newest biostatistics professor in Preventive Medicine, has lived in three American cities before Memphis: Minneapolis, where she earned a doctorate in Biostatistics; Philadelphia, where she completed post-doctoral studies; and Cincinnati, where she spent time with her family during the Covid-19 pandemic. Dr. Zhang enjoyed Minneapolis for its many surrounding lakes where she found a sense of peacefulness near the water, and delighted in capturing sunset photography. Near Philadelphia, Longwood Gardens became a favorite site of hers to enjoy horticulture with an ambience of tranquility. Before coming to the U.S. for her doctoral studies, Dr. Zhang had already spent eight years abroad completing her high school and tertiary education in Singapore and the U.K., respectively.

At the University of Minnesota and University of Pennsylvania, Dr. Zhang developed statistical methods for dynamic treatment regimes and survival analysis. In particular, she uses a multi-state approach to adjust for treatment switching in randomized control trials (RCTs) and intends to expand the methods to personalized decision making in the real-world setting. Dr. Zhang also supported the use of the restricted mean survival time (RMST) as a clinical endpoint. Her current research interests include evaluation of a time-varying treatment and development of adaptive interventions or treatment regimes, and is actively seeking collaborations with similar research interests.

While being our newest biostatistician, Dr. Zhang may have an old soul. She enjoys playing an ancient musical instrument: the guqin, a 7-stringed zither with at least 3000 years of history in China. From childhood, Dr. Zhang's mother would have preferred she go outside and play, to "relax and enjoy life," whereas Zhang preferred the studiousness of reading Chinese literature. She also collects antique tea ware: 20th century bone china from the U.K., France, and Germany.

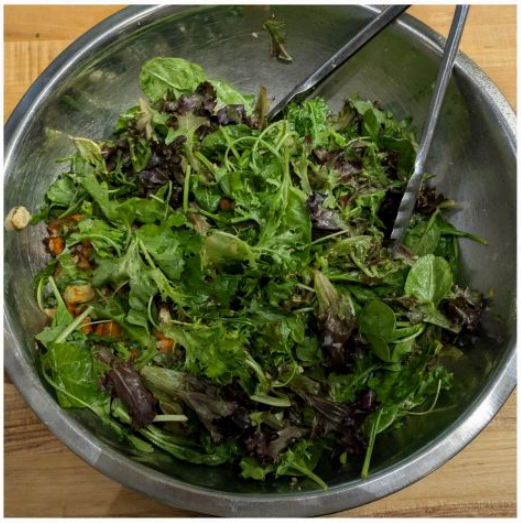
Dr. Zhang enjoys interacting with colleagues is eager, to collaborate with researchers at UTHSC, to share her expertise and to help you forward your work.

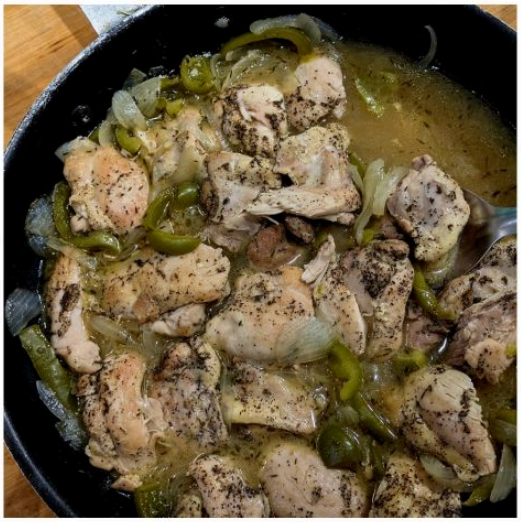
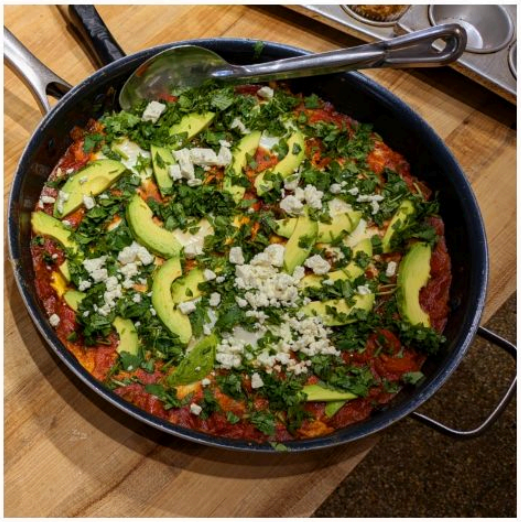
Division Retreat: Team Building with the Church Health Kitchen



Written by Tristan Hayes

The division held its 9th annual retreat on October 18, 2024. This year the team building exercise focused on the prevention aspect of Preventive Medicine: a healthy diet. We first met at the French Truck Coffee counter at Crosstown Concourse. After initial chitchat, we moved to the Church Health community kitchen space at Crosstown. There we took an abridged version of the Church Health Center's healthy cooking and eating class centered on the Mediterranean Diet. The course started with a short video followed by a knife skills demonstration. Then we split into four groups that collaborated in cooking (see photos anti-clockwise from northwest corner): (a) warm autumn salad with lemon-tahini dressing, (b) braised chicken thighs, (c) chipotle shakshuka, and (d) apple and carrot muffins. Then we enjoyed the fruits of our labor -- it was delicious and felt fulfilling. The cooking class was sandwiched between social discussions intended to help us get to know each other better. Tristan Hayes organized the retreat. Gregory Farage contributed to and led the social discussion prompts.



Biostatistics, Epidemiology, and Research Design (BERD)

Written by Tristan Hayes and Hyo Young Choi

The Biostatistics, Epidemiology, and Research Design (BERD) unit of the Department of Preventive Medicine provides easily-accessible consultation, data analysis and investigation to UTHSC investigators across the state. Serving over 200 clients annually, the unit offers expertise in biostatistics, epidemiology, biomedical informatics, community engagement and molecular informatics. The unit consists of three full-time staff, approximately 14 Biostatistics and Epidemiology faculty members, and additional support from partners. The unit provides two services, the BERD Clinic and BERD Consulting. The BERD Clinic, the front face of the unit, provides free one-hour consultations on study design and analysis to the UTHSC community. Over 12 slots are available weekly that can be booked using an online booking service

at https://berd.uthsc.edu. If an investigator needs more in depth help with carrying out data analysis, they can initiate a paid consulting project carried out by BERD Consulting.

In recent years, BERD has expanded significantly, and now includes partnerships with the Center for Biomedical Informatics, the Molecular Resource Center, and the Center for Innovation in Health Equity Research. In addition to the study design and biostatistical advice, researchers can also request advice on bioinformatics, informatics, and health equity. **Graduate Medical Education (GME)** is a key focus area for BERD. Each year, over 40 residents complete research projects with BERD's guidance, and the team regularly delivers presentations on research design and statistics tailored to residency programs.

Impactful Research Projects Since 2015, the BERD unit has completed approximately 370 research projects, supporting numerous grant proposals, manuscripts/publications, and conference presentations. Some recent highlights include:

- **American Shoulder and Elbow Surgeons NEER Award (2023)**: This award-winning project, led by Dr. Chi-Yang Chiu and Tristan Hayes, MSc, analyzed muscle activation patterns following shoulder surgery. The findings are expected to influence surgical practices in orthopedics.
- **Snakebite and Antivenom Study (2024)**: A collaborative study between LeBonheur and Vanderbilt hospitals, this study compared pediatric patients treated with antivenom versus a surgical observation model. The research found no additional benefit from antivenom, despite the significant cost.
- **Violent Crime Intervention Fund (2024-current)**: Partnering with the City of Memphis and the Memphis Police Department, BERD investigators will evaluate state-funded interventions in Memphis' most violent ZIP codes. The team has developed databases and interactive tools to visualize crime trends and guide decision-making.

Partnerships Advancing Research

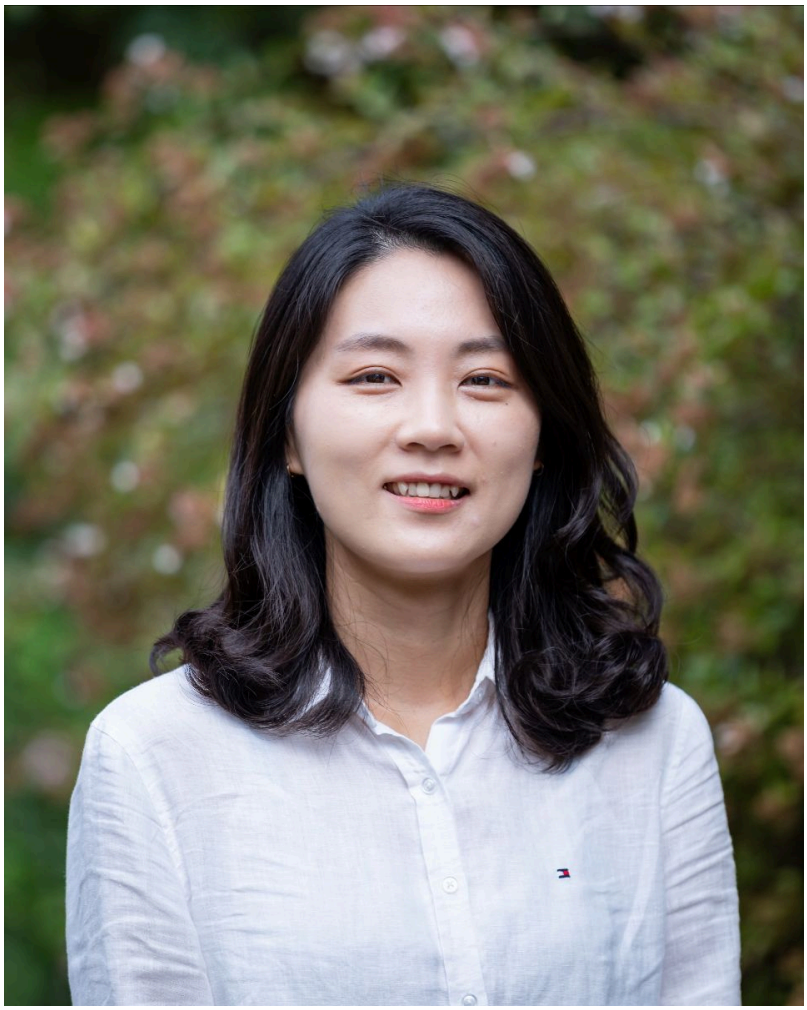
- **OBGYN Department Collaboration: Since 2017**, BERD has provided embedded statistical support for UTHSC's OBGYN department at Regional One Health. OBGYN researchers, including trainees receive dedicated support from a faculty-staff team, currently Dr. Jim Wan and Trish Goedecke. In the past, Dr. Chi-Yang Chiu and Dr. Zoran Bursac served as the faculty leads. The team provides consultation services and lectures on statistical methods. Initially assisting with 10 studies per year, the partnership now supports over 25 annually. The collaboration has

accelerated research efforts, including the department's first Annual Research Symposium featuring a poster session for students, fellows, and faculty.

- **UTHSC Center for Cancer Research Partnership**: In 2023, BERD partnered with the UTHSC Center for Cancer Research to establish the Computational Science Shared Resource (CSSR), led by Dr. Saunak Sen. Supported by four biostatisticians, the CSSR team brings a wealth of expertise in computational cancer research including large and complex datasets and study designs, which cater to the specific needs of each investigator. In 2024, the CSSR team has developed strong collaborations with cancer biologists, contributing to over ten grant applications and enhancing statistical literacy among fellows by participating in HemOnc journal clubs. By clarifying complex statistical concepts and providing mentorship, the CSSR ensures accurate application of statistical principles in cancer research.

Looking Ahead The BERD unit continues to expand its impact by fostering interdisciplinary research collaborations and developing innovative tools to support investigators across UTHSC. By combining expert consultation, cutting-edge resources, and educational opportunities, BERD ensures that UTHSC remains at the forefront of rigorous and reproducible science.

Meet Postdoc Miyeon Yeon



Former summer intern, and now successful post doctoral researcher Miyeon Yeon, PhD
Interviewed by Trish Goedecke

Dr. Miyeon Yeon's interest in biostatistics began as an undergraduate researcher studying Middle East Respiratory Syndrome (MERS) at Chungnam National University in Daejeon, South Korea. This research was multifaceted, including collaboration with medical researchers, and patient interviews; stimulating Dr. Yeon's interest in further collaborative medical research. To pursue this, Yeon chose to study in the United States, where she believed the most cutting-edge research methods were being developed. Thanks to support from a friend who was studying at NYU, she was able to successfully apply and complete a doctoral program despite lacking such know-how in her hometown.

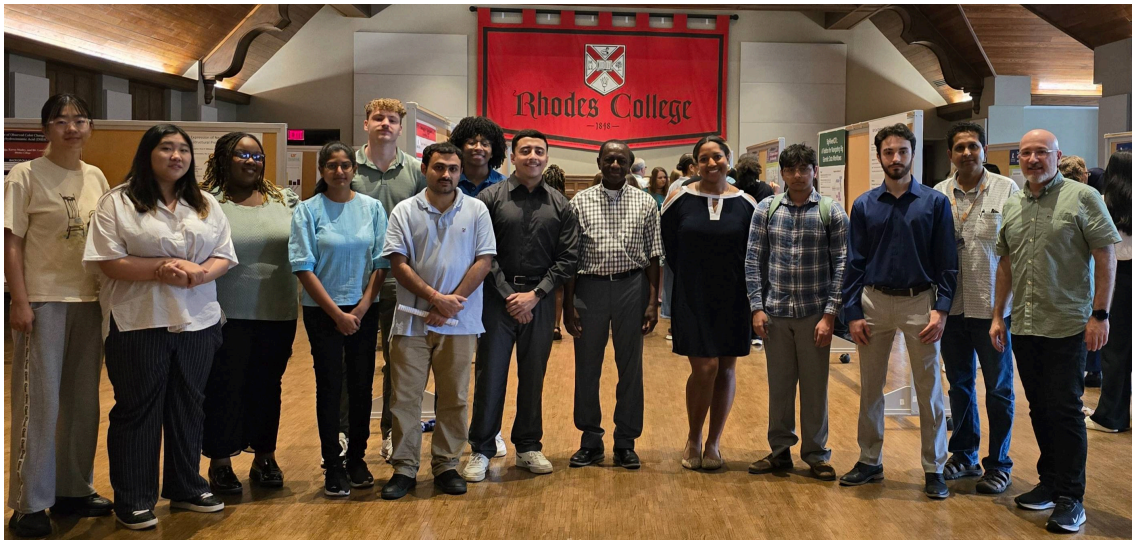
Dr. Yeon first embarked on her American adventure at Florida State University in Tallahassee, where she earned an MS and PhD in biostatistics. She came to Memphis in the summer of 2023 for a research project to assess RNA degradation in total RNA-seq and formalin-fixed paraffin-embedded as an intern

with the Biostatistics division. Her work impressed division members such that she was offered a post-doctoral position collaborating with biostatistician Dr. Hyo Young Choi and Dr. Neil Hayes of the Center for Cancer Research in the fields of computational biology and cancer genomics.

Dr. Yeon learned to drive from Dr. Gregory Farage, and hopes to become a generous person like him and the people who have helped her. She enjoys walking and Judo as methods of stress relief, and took up marathoning while in Florida. She participated in her first Memphis marathon on December 7th, the famed St. Jude Marathon. We are grateful to have this bold, adventurous young woman join our team.

Miyeon at graduation from Florida State University

Biomedical Data Science Internship Program for Summer 2024



Biomedical Data Science Interns with the UTHSC Summer Research Scholars at the Community Science Exhibition 2024

Summary By Tristan Hayes with contributions from internship mentors

The Biomedical Data Science Internship Program has ‘graduated’ another successful summer class of interns. Congratulations to Durbadal Ghosh, Shanti Sree-Edara and Yinan ‘Ivy’ Chen and their mentors Drs. Gregory Farage, Saunak Sen, Kimberly Kelly, Chi-Yang Chiu, Zhu Wang, and Lauren Bell. Excluding a one-year pause for COVID, this program has been run every year since 2016.

In the Biomedical Data Science Internship program, students receive hands-on data analysis experience on a medical science related project and with the goal of creating either a software package and/or a manuscript. This year, we had three grad students from Florida State University, University of Southern Mississippi, University of Illinois at Urbana-Champaign. In addition to hands-on research experience, the students participated in a mentorship program, run in collaboration with University of Colorado and UTHSC’s Summer Research Scholars Program. All interns gave presentations in the Biostatistics Seminar Series and presented a poster at the Community Science Exhibition held at Rhodes College on July 27, 2024.

Durbadal Ghosh, PhD student Biostatistics, Florida State University; Mentors Gregory Farage and Saunak Sen. During his internship, Durbadal contributed

to the BigRiverQTL.jl Julia package designed to streamline quantitative trait locus (QTL) analysis. BigRiverQTL.jl integrates multiple functionalities, including preprocessing, genome scans, and visualization tools, to facilitate efficient and accessible QTL and eQTL analysis within the Julia programming environment. He also contributed toward process improvements to the package FlxQTL.jl, a package for multivariate and longitudinal trait analyses.

Shanti Sree-Edara, MPH Biostatistics and Epidemiology, University of Southern Mississippi; Mentors Kimberly Kelly and Chi-Yang Chiu. Shanti conducted a study on the impact of gift card challenges on the quality and quantity of research. Deployed a Qualtrics survey to NIH-funded researchers and other research groups, analyzed the data, performed cross-tabulation and ordinal regression, and presented the findings. At the end of her internship she worked on a Qualtrics survey for a skin cancer awareness project - pre and post intervention and conducted literature reviews.

Yinan 'Ivy' Chen MSc Statistics, University of Illinois at Urbana-Champaign; Mentors Zhu Wang and Lauren Bell. Ivy examined trends in drug overdose deaths related to illicitly manufactured fentanyls (IMFs) among adolescents over. She built a linear model to analyze the changes in drug use across this demographic. At the end of her project, she built an interactive web application in R Shiny to promote awareness and public engagement in drug overdose deaths.

Preparations are on to welcome the 2025 cohort of interns. Applications are being accepted as we speak for next year. See more here: https://www.uthsc.edu/preventive-medicine/internships.php

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