Wake Forest University
School of Medicine

GOOD NEWS!

Wake Forest University School of Medicine Cardiovascular Sciences Center

Summer 2023

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DRS. TANYA GWATHMEY & ANDREW SOUTH (MPIs)

were awarded a R25 from the NICHD for "The Wake Forest University School of Medicine Training in Research Affecting Child-Health (TRAC) Program", with a project period of Sept. 1, 2023, through June 30, 2028 to support 9-12 participants per year. This is the first child health research training grant in the history of WFUSM. It is an immersive eight-week pediatric-specific skills course over the summer with a longitudinal component over the following academic year that fosters peer-to-peer mentorship. This longitudinal program will empower learners at all levels (undergraduate, graduate, and medical students, residents, and fellows) to conceptualize, design, and implement a novel and innovative research project centered on an idea that they are passionate about and that addresses a critical knowledge gap in child health and development. Participants will be the Principal Investigators of their project, and faculty members will coach participants through their independent, mentored research project. Several faculty mentors are members of the Cardiovascular Sciences Center, and TRAC affords the opportunity to improve cardiovascular health in youth related to vascular development and hemodynamics of pregnancy and parturition, youth-onset hypertension and renal mechanisms of cardiovascular disease, and antenatal programming of adult cardiovascular and cardiometabolic diseases. TRAC will foster acquisition of lasting child health-related research skills with an emphasis on independence and critical thinking.

AUSTIN'S DATA TOOLS AND TIPS

Correlation

Correlation analysis is one of the central analysis methods in statistics and is a simple idea that most novice analyst can grasp on to. Most correlation metrics return values between -1 and 1. The positive or negative value determines the direction of the relationship between the two variables. If you have a positive correlation, then the value of variable A increases when the value of variable B increases. The relationship is inverted when the correlation in negative (when A increases B decreases). Correlation is a foundational concept of many regression modeling concepts, especially linear regression. For example, the assumption that there is no auto-correlation (correlated samples/subjects) in linear regression. Correlation analysis is a great way to get know your data and is one the first things I consider doing when starting a new project. It should be noted that correlation analysis is best suited for numeric continuous data; however, there are alternative correlation methods that can handle data in other distributions (like binomial data).

One common product of this analysis is a correlation heat map. These heat maps visualize the relationships amongst different variables in your data usually with brighter colors representing positive correlations. Network maps can also be produced from correlation analyses. From visualizations like these, one can tell which variables will be important in subsequent analyses or which variable may be redundant or non-informative during outcome modeling. These will help summarize the overall complexity of your data.

Almost all statistical analysis software applications have a correlation analysis feature. If you're using SAS, you can run PROC CORR. R users can use the cor() function which will produce a correlation matrix.

Thanks for reading this edition of data tools and tips. Don't hesitate to reach out to me if you have any questions or would like to talk more.

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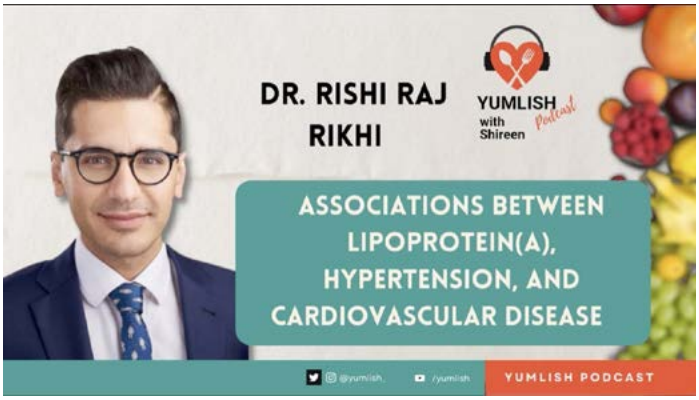
ANNOUNCEMENTS

2024 Pilot Award Program. The projects should be those in need of support to promote new areas or technologies for cardiovascular research (basic, clinical, population), as well as to foster new collaborations, particularly across the Atrium Health System. The goal of the CVSC Pilot Program is to allow investigators (particularly early career researchers) to pursue novel and innovative ideas that will improve the likelihood of obtaining extramural funding for their research. We encourage research that uses Institutional Cores and other shared resource. We intend to fund 3 pilot awards at $20,000 each meant to allow investigators to perform critical experiments, access core facilities or improve analyses to address specific critiques raised by reviewers for already submitted and reviewed applications. **Completed applications will be due ~ Spring 2024.** Please contact Dr. Liliya Yamaleyeva (lyamaley@wakehealth.edu) if you need further guidance.

INVITED PRESENTATIONS

Dr. Rishi Rikhi discussed the associations between lipoprotein(a), hypertension, and cardiovascular disease during the Yumlish with Shireen podcast.



Click Image to view the podcast.

Akbilgic

Dr. Akbilgic presented an invited talk at St. Jude Children's Research Hospital, Memphis, TN on July 31, 2023, titled "Remote Delivery of ECG-AI Models for Disease Detection and Risk Prediction."

Dr. Akbilgic gave an invited talk at the University of Wisconsin Cardiology Grand Rounds, Madison, WI titled "Emerging Role of Electrocardiographic Artificial Intelligence Modes in Cardiovascular Outcome Prediction."

Dr. Liam Butler has been invited to present "Feasibility of Remote Monitoring for Fatal Coronary Heart Disease from Single Lead ECG" during the HRX Innovators at Heart Conference in Seattle, WA, September 21-23, 2023.

FUNDING

During the months of May to August, CVSC members were awarded 33 grants. Below we highlight a couple of these awards.

Goldman

Edwards

Herrington

Dr. Matthew Goldman and Co-Is **Dr. Matthew Edwards, Dr. David Herrington**, Dr. William Downey, and Dr. Greg Stanley have been awarded a 2-year grant from Janssen Scientific Affairs. "Utilization of Optimal Medical Therapy to Prevent Cardiovascular Morbidity in Patients with Peripheral Vascular Disease" is a multi-institutional grant between Atrium Wake Forest Baptist and Sanger Heart and Vascular. The aims of this grant are to evaluate adherence rates to AHA Guideline-Directed Optimal medical therapy in patients with Peripheral Arterial Disease (PAD) based upon non-invasive vascular laboratory studies. It also evaluated cardiovascular outcomes in this PAD population.

Xu

Dr. Haodong Xu's research program titled "Role of the ATP-dependent chromatin-remodeling enzyme Brg1 in the regulation of cardiac Na^+ channel" has recently secured funding through an NHLBI R56 grant. In their pursuit, Dr. Xu's team employs cutting-edge techniques, including state-of-the-art methods for molecular signaling and electrophysiological investigations. Their ultimate goal is to furnish direct evidence that Brg1's suppression of $Na_V1.5$ expression constitutes one of the pivotal mechanisms driving VT/VF development in IHD, leveraging transgenic mouse models to achieve this insight.

CAREER CORNER

2023 Summer Research Programs to Increase Diversity in Biomedical Science Careers:

The Cardiovascular Sciences Center and Sticht Center for Healthy Aging and Alzheimer's Prevention host two summer research programs: the Excellence in Cardiovascular Sciences (EICS) program in the 31st year and the Enhancing UNderGraduate Education and Research in AGing to Eliminate Health Disparities (ENGAGED – joint program with WSSU and WFU) in its 4th year.

The following trainees and mentors participated in the programs for 2023:

EICS STUDENT	UNDERGRADUATE INSTITUTION	MENTOR
Joshua Abrams	Wake Forest University	Katherine Cook — Surgery Hypertension
Blessed Asare	University of Colorado Denver	Andrew South — Pediatrics- Nephrology
Ternya Gibson	Fort Valley State University	Leah Solberg Woods — Internal Medicine-Molecular Medicine /Mackenzie Fitzpartrick (PhD Graduate Student)
Autumn Huskey	Lander University	David Soto Pantoja — Surgery Hypertension
Nicole Morales	University of Puerto Rico - Cayey	Christina Hugenschmidt — Internal Medicine-Gerontology & Geriatric Medicine
Bella Parker	Stetson University	Xuewei Zhu — Internal Medicine-Molecular Medicine
Ajay Roy	Wake Forest University	Liliya Yamaleyeva — Surgery Hypertension
Shayla Sanders	East Carolina University	TanYa Gwathmey — Surgery Hypertension / /Patricia Smyre — Maya Angelou Center for Health Equity
Daniel Sartin	North Carolina State University	Justin Moore — Implementation Science
Leilani Whyte	North Carolina A&T State University	Dhanendra Tomar — Internal Medicine-Cardiovascular Medicine

ENGAGED STUDENT	UNDERGRADUATE INSTITUTION	MENTOR
Sami Atassi	North Carolina State University	Rachel Zimmer — Internal Medicine-Gerontology & Geriatric Medicine
Mia Barnes	Wake Forest University	Ken Kishida — Physiology & Pharmacology
Natnael Belay	Hope College	Pooja Jadiya — Gerontology & Geriatric Medicine
Alice Chong	Wake Forest University	Miranda Orr — Gerontology & Geriatric Medicine
Kathryn Espinosa-Ponce	Greensboro College	Ashley Weaver — Biomedical Engineering
Ivy Greene	Wake Forest University	Dhanendra Tomar — Internal Medicine-Cardiovascular Medicine
Quinecia Hayes	Winston Salem State University	Jill Keith — Biological Sciences & Chemistry, Winston Salem State University
Christian Johnson	Virginia Commonwealth University	Jeff Williamson — Gerontology & Geriatric Medicine/ Michelle Mielke — Epidemiology & Prevention
Grace Kiwanuka-Woernle	Emory University	Allison Caban-Holt — Maya Angelou Center for Health Equity
Luis Perez Dieppa	University of Puerto Rico - Cayey	Ashley Weaver — Biomedical Engineering
Keysha Resto Bravo	University of Puerto Rico - Mayaguez	Daniel Kim-Shapiro — Physics

As evidence of the success of these programs, a recent review of the first 4 years of the ENGAGED program documents early program outcomes: 1) 119 paid undergraduate research opportunities via in-person or virtual programming for 61 unique individuals during academic year and summer sessions, with 49% participating in >1 session (academic year Research Club, academic year Research Internship, Summer Internship); 2) New formal and informal aging-related activities created or revamped/updated for trainees across the three partner sites (Research Club, lectures/seminars, didactic courses, discussion sessions focused on aging); 3) Short-term scholarly achievements include 31% trainee attendance/presentations at scientific meetings and 20% published an abstract of the ENGAGED research; 4) While 26 remain in undergraduate training, 34 of 35 obtained a BS/BA (100% in medicine, science, technology, engineering and math [MSTEM] and 29% aging-related degrees). Longer-term career outcomes at this early stage in the program indicate success of graduates overall: ~80% are currently in the BMS workforce and/or advanced degree programs, with ~27% returning to WFUSM as trainees or in research staff positions; 59% plan a future career in BMS research, with 56% of those interested in aging/health disparities research; 35% entered MSTEM advanced degree programs (MD, PhD, MS, health professional programs; 4 MS degrees already attained) with 9 more applying. Thus, ENGAGED is well-positioned to advance our objectives from a solid foundation of promoting interest in, and exposure to, research experiences in aging/health disparities for diverse undergraduate trainees.

PUBLICATIONS

Between the months of May-August, Cardiovascular Sciences Center members published 114 manuscripts. Of these, **10** were CVSC first author publications. Below we highlight publications from the CVSC and SHVI.

Perrin EC, Ravi HL, Borra GS, **South AM**. Prevalence and risk factors of disordered eating behavior in youth with hypertension disorders. *Pediatr Nephrol*. 2023 May 17:1–11. doi: 10.1007/s00467-023-05921-1. Epub ahead of print. PMID: 37195544; PMCID: PMC10189692.

Alexander BT, **South AM**, August P, Bertagnolli M, Ferranti EP, Grobe JL, Jones EJ, Loria AS, Safdar B, Sequeira-Lopez MLS; American Heart Association Council on the Kidney in Cardiovascular Disease; Council on Cardiovascular and Stroke Nursing; Council on Cardiovascular Radiology and Intervention; Council on Hypertension; and Council on Lifestyle and Cardiometabolic Health. Appraising the Preclinical Evidence of the Role of the Renin-Angiotensin-Aldosterone System in Antenatal Programming of Maternal and Offspring Cardiovascular Health Across the Life Course: Moving the Field Forward: A Scientific Statement From the American Heart Association. *Hypertension*. 2023 May;80(5):e75-e89. doi: 10.1161/HYP.0000000000000227. Epub 2023 Mar 23. PMID: 36951054; PMCID: PMC10242542.

Corneil H, Liblik K, Varghese SS, Masotti B, Moulson N, McKinney J, Allan KS, Phelan D, Thakrar A, Johri AM, Grubic N. Shared Decision-Making in Athletes Diagnosed With a Cardiovascular Condition: A Scoping Review. *Curr Probl Cardiol.* 2023 May 19;48(10):101815. doi: 10.1016/j.cpcardiol.2023.101815. Epub ahead of print. PMID: 37211302.

Mitchell CC, Frye C, Jankowski M, Symanski J, Lester SJ, Woo A, Gilliland Y, Dragulescu A, Abraham T, Desai M, Martinez MW, Nagueh SF, Phelan D. A Practical Approach to Echocardiographic Imaging in Patients With Hypertrophic Cardiomyopathy. *J Am Soc Echocardiogr*. 2023 May 7:S0894-7317(23)00249-3. doi: 10.1016/j.echo.2023.04.020. Epub ahead of print. PMID: 37160197.

Slivnick JA, Alvi N, Singulane CC, Scheetz S, Goyal A, Patel H, Sarswat N, Addetia K, Fernandes F, Vieira MLC, Cafezeiro CRF, Carvalhal SF, Simonetti OP, Singh J, Lang RM, Zareba KM, Patel AR. Non-invasive diagnosis of transthyretin cardiac amyloidosis utilizing typical late gadolinium enhancement pattern on cardiac magnetic resonance and light chains. *Eur Heart J Cardiovasc Imaging*. 2023 May 31;24(6):829-837. doi: 10.1093/ehjci/jeac249. PMID: 36624559.

Malahfji M, Crudo V, Kaolawanich Y, Nguyen DT, Telmesani A, Saeed M, Reardon MJ, Zoghbi WA, Polsani V, Elliott M, Bonow RO, Graviss EA, Kim R, Shah DJ. Influence of Cardiac Remodeling on Clinical Outcomes in Patients With Aortic Regurgitation. *J Am Coll Cardiol.* 2023 May 16;81(19):1885-1898. doi: 10.1016/j.jacc.2023.03.001. Epub 2023 Mar 5. PMID: 36882135.

Kalscheur MM, **Akbilgic O**. AI-Enabled ECG for Paroxysmal Atrial Fibrillation Detection: One Step to Closer to the Finish Line. *JACC Clin Electrophysiol.* 2023 Jun 14:S2405-500X(23)00336-5. doi: 10.1016/j.jacep.2023.05.023. Epub ahead of print. PMID: 37498242.

Karabayir I, Gunturkun F, Butler L, Goldman SM, Kamaleswaran R, Davis RL, Colletta K, Chinthala L, Jefferies JL, Bobay K, Ross GW, Petrovitch H, Masaki K, Tanner CM, **Akbilgic O**. Externally validated deep learning model to identify prodromal Parkinson's disease from electrocardiogram. *Sci Rep*. 2023 Jul 29;13(1):12290. doi: 10.1038/s41598-023-38782-7. PMID: 37516770; PMCID: PMC10387090.

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