



# Empowering Early Career Researchers: The Jackson Heart Study Smith Scholars Program

Cellas A. Hayes<sup>1</sup> · Raymond Jones<sup>2,3,4</sup>

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## Abstract

The University of Mississippi Medical Center Graduate Training and Education Center houses the Robert E. Smith, MD, Scholars Program, a two-year certificate program that equips predoctoral trainees from five Mississippi universities with advanced research skills in cardiovascular epidemiology. Funded by the National Heart, Lung, and Blood Institute (NHLBI), the program focuses on addressing health disparities, minority health, and health inequities in underserved communities. Trainees receive mentorship, career coaching, and a \$7,500 annual stipend, building a foundation for postdoctoral opportunities and expanding professional networks. The Smith Scholars Program emphasizes population health and provides interdisciplinary training in areas such as biostatistics, scientific communication, and cardiovascular health. It is uniquely positioned to address systemic challenges, particularly in Mississippi, a state with high cardiovascular disease prevalence and limited research funding. The program's regional advantage and its partnership with the Jackson Heart Study offer scholars exposure to health disparities in Black/African American communities, preparing them to contribute to innovative, community-based research. Additionally, it fosters collaborative science, enabling participants to overcome academic barriers and engage with large-scale health equity research efforts. The Smith Scholars Program has been instrumental in shaping the career trajectories of its participants, facilitating their transition to postdoctoral positions and independent research roles.

**Keywords** Epidemiology · Predoctoral trainees · Population health · Health disparities · Early career trainees · Jackson Heart Study

## Introduction

The University of Mississippi Medical Center Graduate Training and Education Center (UMMC-GTEC) is dedicated to training the next generation of scientists and innovators, equipping them to contribute to the advancement of knowledge through epidemiologic research. The Smith Scholars Program is a two-year doctoral-level certificate program

designed to provide research training in cardiovascular epidemiology, emphasizing a population health perspective funded by the National Heart Lung and Blood Institute (NHLBI).

The UMMC-GTEC program is named after Robert E. Smith, MD, a revered physician and advocate for healthcare access and treatment for African Americans in Mississippi. The Smith Scholars Program is a complementary addition to the training that doctoral students receive from biomedical and health sciences institutions from five Mississippi universities (i.e., Jackson State University, Mississippi State University, University of Mississippi, University of Mississippi Medical Center, and University of Southern Mississippi). The Robert Smith, MD, Scholars Program UMMC-GTEC is a two-year program focused on cardiovascular epidemiology, biostatistics, health disparities, minority health, and scientific skills like writing and presentations (Box 1). Scholars receive mentorship, career coaching, opportunities to collaborate on research, and a \$7,500 annual stipend (Box 1). The program is open to doctoral students from five Mississippi universities, providing career preparation for postdoctoral positions and expanding professional networks through

✉ Cellas A. Hayes  
cahayes3@stanford.edu

<sup>1</sup> Department of Epidemiology and Population Health, Stanford University School of Medicine, Stanford, CA 94305, USA

<sup>2</sup> Division of Gerontology, Geriatrics, & Palliative Care, Department of Medicine, Heersink School of Medicine, University of Alabama at Birmingham, Birmingham, AL, USA

<sup>3</sup> Department of Physical Therapy, School of Health Professions, University of Alabama at Birmingham, Birmingham, AL, USA

<sup>4</sup> Center for Exercise Medicine, University of Alabama at Birmingham, Birmingham, AL, USA

partnerships with organizations like the Interdisciplinary Association Population Health Science and American Heart Association (Box 1). Through this perspective, we aim to underscore the value of equipping predoctoral trainees with the necessary skills and knowledge to address health disparities and improve health outcomes in marginalized communities. Moreover, we have provided our personal perspective on how the Smith Scholars Program offered a transformative experience in the form of key experiences and skills gained and the impact on career/future goals.

**Box 1** Robert Smith, MD, Scholars Program UMMC-GTEC

Program aspect	Detail
Duration of the program	Two years
Focus areas of the program	Cardiovascular epidemiology, biostatistics, health disparities and minority health, responsible conduct of research, scientific writing, scientific presentations
Training components for scholars	Individual research mentoring, career coaching, collaboration on scientific manuscripts and abstracts
Scholar's benefits	Memberships in scientific organizations, opportunities to contribute to research studies, mentorship from senior researchers, career guidance, \$7,500 annual stipend
Funding of the program	National Heart, Lung, and Blood Institute, National Institutes of Health, Department of Health and Human Services
Academic credit for the program	Not conferred; tuition not charged
Eligibility for the program	Doctoral students in biomedical and health sciences from five Mississippi universities (Jackson State University, Mississippi State University, University of Mississippi, University of Mississippi Medical Center, and University of Southern Mississippi)
Career preparation for scholars	Preparation for post-doctoral fellowships, residencies, early career faculty positions
Partnerships with program	Collaboration with national, regional, and state-level scientific organizations
Professional networks provided through the program	Expansion of professional networks: Interdisciplinary Association for Population Health Science (IAPHS); American Heart Association (AHA)

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## Training Programs for Underrepresented Minorities Are Essential and Established

The importance of equipping early-career researchers with the skills needed to address health disparities is increasingly recognized within academic and scientific training programs. Structured initiatives, such as the NIH Diversity Program Consortium and the Building Infrastructure Leading to Diversity (BUILD) program, have showcased significant success in diversifying the biomedical workforce by providing mentorship, professional development, and research opportunities tailored to underrepresented minority researchers [1]. Similarly, research from the Research Center in Minority Institutions (RCMI) program shows that focused support systems can improve research capacity among minority investigators, aiding in the retention and success of early-career researchers [2, 3]. The key to the effectiveness of these programs is the emphasis on culturally responsive training, which incorporates social determinants of health and health inequities into the research framework [4]. Studies have shown that mentorship, also, plays a critical role in this context, with strong mentor–mentee and peer-peer relationships being linked to higher research productivity and greater career satisfaction for underrepresented trainees [5–10]. The integration of community-based research frameworks ensures that early-career researchers are equipped to engage with societal, environmental, and structural factors contributing to health disparities. These training models, JHS-GTEC and other training programs (e.g., Disparities Researchers Equalizing Access for Minorities [DREAM] NIH Health Disparities Research Institute [HDRI], Robert Wood Johnson Foundation Health Policy Research Scholars and Culture of Health Leaders Program, NIH Minority Health and Health Disparities International Research Training [MHIRT], NHLBI Programs to Increase Diversity among Individuals Engaged in Health-Related Research [PRIDE], etc.) are essential to fostering a workforce capable of advancing health equity and addressing complex challenges facing minoritized and marginalized communities.

## Regional Advantage of Smith Scholars Program

The Smith Scholars program emphasis on recruiting and admitting predoctoral trainees from five Mississippi universities offers a distinct and strategic advantage, particularly in addressing health disparities and systemic challenges that are prevalent in the state. Mississippi is not only one of the most underserved states in terms of

research funding, but it is also home to the largest population of Black individuals in the country, which presents an opportunity to directly impact communities that are disproportionately affected by health disparities including cardiovascular disease (CVD). The concentration of CVD and related risk factors in key areas, such as the surrounding Jackson, MS counties, highlights the importance of having a program that can tackle these issues localized in proximity to the problem.

Health disparities in Mississippi are exacerbated by social determinants of health (SDOH) [11, 12]. The Smith Scholars Program is uniquely positioned to address health disparities for CVD and disparities in research and educational training for Mississippi predoctoral students. The program offers its trainees exposure to a region where the need for research-driven healthcare solutions is most acute, allowing them to become part of the solution to regional health crises. This is especially important when considering the historic underrepresentation of Mississippi in large national research efforts and funding opportunities especially for trainees. For instance, CAH was the first doctoral trainee at the University of Mississippi, an R1 institution, to receive an F31 award in nearly 40 years [13]. Moreover, in 2023, Dr. Maria Mohammed was the first trainee from a Mississippi institution to be awarded the prestigious NIH F99/K00 Predoctoral to Postdoctoral Fellowship [14]. The disparities in research funding opportunity levels are emphasized within other areas that overlap with the region. For example, Mississippi has six historically black colleges and universities (HBCUs) and has the largest percentage of Black/African Americans. Yet, other awards like the NIH Maximizing Opportunities for Scientific and Academic Independent Careers (MOSAIC) K99/R00 program have never been awarded to a postdoc at an HBCU [15]. In other categories, there are other disparities like the recruitment and retention rate of Black predoctoral trainees within predominantly white institutions (PWI) that are leading research institutions within the South. CAH was the first Black/African American male to receive his Ph.D. in Pharmaceutical Sciences/Pharmacology from the University of Mississippi and attests that the Smith Scholars Program directly contributed to his success in receiving the F31, completing his doctoral degree, and transitioning to Stanford University as a postdoctoral fellow [13]. These milestones and accomplishments underscore the systemic barriers that researchers in the state face, making the program's focus on overcoming these obstacles not only timely but also critical.

An additional advantage of the program lies in its unique interdisciplinary training that helps students actively overcome the systemic barriers and challenges to research opportunities that are not widely available or limited for Mississippi institutions. The interdisciplinary training also

contributes towards the career advancement of the doctoral trainees with scientific communication through presentations at the Mississippi Academy of Sciences annual conference and attending the American Heart Association (AHA) Epi/Lifestyle conference. This exposure allows trainees to build networks and gain visibility in national and international scientific communities that they would not typically have access to. As a result, the program not only offers research training but also prepares its students for future success in overcoming the systemic challenges that are prevalent in academia and the broader scientific community, but specifically, for regional and demographic-related disparities.

Finally, the program's collaborative framework extends beyond traditional professional development and provides direct research training that benefits from the involvement of renowned mentors within their respective fields. Faculty members such as Drs. Jennifer Reneker, Bettina Beech, Elizabeth Heitman, Roland Thorpe Jr., Keith Norris, Marino Bruce, and Benjamin Walker brought and bring a wealth of expertise to the program. This multi-institutional effort enhances the interdisciplinary nature of the program, ensuring that students receive comprehensive training that spans across various areas of health disparities, epidemiology, and biostatistical research. By leveraging these relationships, the program creates a robust learning environment where trainees can thrive academically while making significant contributions to the research field.

## The Novelty of the Jackson Heart Study

The field of public health is at a critical juncture, particularly in addressing the vast health disparities that disproportionately affect minority populations, especially Black/African Americans. Underrepresented minorities (URMs) remain significantly underrepresented in academia and scientific research, which limits the diversity of perspectives and the development of culturally relevant solutions to pressing public health issues [16–18]. The novelty of the Smith Scholars program is that it provides interdisciplinary research training outside of the student's institution and ongoing dissertation work. In addition, the program places a strong emphasis on minority health and health disparities with cardiovascular epidemiology and previously required the use of the JHS previously collected data. Programs like the Smith Scholars are essential in providing a unique, interdisciplinary training model that equips students with the tools needed to address the social, biological, and environmental determinants of health that drive disparities [19]. Additionally, outside of a few major cohorts, such as REasons for Geographic And Racial Differences in Stroke, JHS, and Health & Aging Brain among

Latino Elders (HABLE/HABS-HD), there are few large-scale opportunities to study health disparities in exclusively Black/African Americans, especially in the southern USA [19–22]. The Smith Scholars program is well-positioned to help fill this gap by training a new generation of researchers who are committed to advancing health equity through innovative, community-based research, and secondary data analysis.

## **CAH: A Path Forward: Addressing Cardiovascular and Dementia Disparities in Underserved Communities**

### **Growing Up and Finding Inspiration**

I grew up in rural Ludlow, Mississippi. Throughout my life, I witnessed significant health disparities in the Black community, particularly in CVD risks like diabetes and hypertension, along with the negative outcomes like stroke and cancer. The structural gaps in healthcare access were evident, from issues like limited insurance coverage to the unavailability of healthcare providers, making it difficult for individuals to even make time for doctor visits. These experiences motivated me to pursue a career where I could bridge these healthcare gaps and understand diseases that are affecting my people. I started my research journey as a sophomore undergraduate in a preclinical neuropharmacology lab, initially as part of a work-study job. As a first-generation college graduate, I continued my training by pursuing a Ph.D. in Pharmaceutical Sciences/Pharmacology focusing on neuroendocrine signaling in stroke.

What motivated me to join the Smith Scholars program was the realization that it takes a long time—often 10 years—to translate research from the bench to the bedside. As a basic scientist utilizing *in vitro* and *in vivo* models, I sought out an opportunity (the Smith Scholars Program) to gain interdisciplinary training to study the same disease (stroke) in Black people. As a young graduate student, my goal was to acquire translational skills that could more directly help the communities disproportionately affected by CVD, risk factors, and systems that affect health outcomes. The Smith Scholars Program shifted my focus and my interests towards secondary data analyses in diverse populations for Alzheimer's disease and related dementias (ADRD), CVD, and risk factors. Thus, I am building that expertise as a postdoc to contribute to developing an interdisciplinary laboratory focused on understanding the mechanisms underlying health disparities in Black and Brown communities, particularly with biomarkers and CVD and ADRD.

### **Key Experiences and Skills Gained**

During my time in the program, I worked on a project examining high sensitivity C-reactive protein (hs-CRP) as a biomarker for stroke incidence within the Jackson Heart Study cohort which was recently accepted in a peer-reviewed journal (*Ethnicity and Disease*). Along the way, I gained essential skills in manuscript and proposal preparation, time management for preclinical and epidemiological/biostatistical work, and navigating scientific presentations and publications. I also became proficient in biostatistics tools like STATA and R, moving beyond the preclinical tools like SigmaPlot and Excel that I had previously used. Additionally, I worked with two different research teams, further refining my ability to do collaborative science.

The largest challenge I faced was adapting my scientific writing from a preclinical focus to an epidemiological and statistical one, which required a different skillset. I overcame this challenge through weekly mentorship sessions, each lasting 30 minutes over the span of two years with Drs. Jennifer Reneker and Roland Thorpe Jr.. This mentorship was crucial in building the foundation for my postdoctoral work, which has since led to seven collaborations across diverse cohorts that I lead. I have also been awarded other fellowships, including the Stanford Propel Fellowship, HABS-HD Health Equity Scholars Program, and Burroughs Wellcome Fund Postdoctoral Diversity Enrichment Program Fellowship, while preparing for further NIH K99/R00 applications. Dr. Roland Thorpe Jr has now transitioned as my co-mentor for my postdoctoral and early career training while Dr. Reneker remains a strong supporter through letters of recommendations and making me aware of research and professional development opportunities.

### **Impact of Experience on Career/Future Goals**

The program significantly impacted my career trajectory, leading me to completely switch fields for my postdoc. I transitioned from basic science to a focus on CVD and ADRD in diverse populations. I now have my own approved ancillary study within the JHS enhancing my potential as an independent researcher and a career establisher. The interdisciplinary approach of the program, particularly through collaborations and workshops, has broadened my understanding of research and how to navigate accessing and maximizing the use of existing data. Dr. Thorpe and I are currently co-authoring several papers, and I am being trained to become a leader in the field of. Through my experience through the Smith Scholars Program, I learned an abundance of translational skills which is scientific collaborations and scientific technical writing that exponentiate my current success as a postdoctoral fellow.



## RJ: Beyond Disciplines — Nurturing Interdisciplinary Skills and Team Science in Early Career Researchers

### Finding Peers and Broadening Research Exposure

I was born and raised in small-town Patterson, Louisiana, to a family of hardworking sugarcane farmers. I am a first-generation college student, and I had absolutely no clue what I wanted to do going into college. In 2011, I started college on academic and music scholarships and decided to major in Kinesiology with a concentration in Exercise Science from Southeastern Louisiana University. Why did I choose this? The only answer that I could give at that time was “Because I like sports.” Unbeknownst to me at that time, this would become my career.

There was not much research going on at Southeastern. The fantastic professors there were dedicated to being some of the best teachers that I have ever had. I never got any formal research experience during my undergraduate degree, and it was not until my graduate program, at the same institution, that I was able to become involved in some small research projects focused on occupational environment and thermoregulation in offshore fishermen (Dr. Bovorn “Buddy” Sirikul) and acute responses to exercise modalities (Dr. Robert Kraemer). These experiences led me to pursue my Ph.D. in Kinesiology with a focus in Exercise Physiology at the University of Southern Mississippi in the School of Kinesiology and Nutrition under the mentorship of Dr. Stephanie (McCoy) Smith where my work focused on the impact of sedentary behavior on vascular health and function in Black and White men in Mississippi.

I applied for the Smith Scholars program in the second year of my doctoral program for several reasons. I knew that in order to do the work that I was interested in (e.g., minority health and health disparities), and I needed to learn and develop a unique skillset. I also wanted to engage in population health and epidemiology work. Lastly, I recognized that being part of a cohort with peers who have similar interests and the opportunity of being mentored by world-renowned researchers in their areas was an opportunity that I could not pass up.

### Key Experiences and Skills Gained

During my time in the program, my main project focused on the impact of occupational sitting on systemic inflammation by examining hs-CRP within the JHS cohort which was published in the *American Journal of Lifestyle Medicine* [23]. I gained specific skills in minority health, health

disparities, biostatistics, and cardiovascular epidemiology, but also supplemented these skills with some ‘soft skills’ of communication, technical writing, time management, presentation skills, and collaboration. The importance of team science was emphasized, and showcased, from the beginning of the program and that is something that has stayed with me throughout my career, thus far.

### Impact of Experience on Career/Future Goals

My time as a Smith Scholar jump-started my career and transformed my thinking to be more translational and collaborative. I did not stray far from my training in Exercise Physiology, I just incorporate minority health, disparities, and cardiovascular epidemiology into the work that I am currently doing. Upon graduating from my doctoral program, I immediately started a Postdoctoral Fellowship at the University of Alabama at Birmingham (UAB) in the Center for Exercise Medicine, where I was on a NIH/NICHHD T32. During my Postdoctoral Fellowship, I, mostly, published work on epidemiology in chronic populations. After a year and a half (June 2022), I received internal grant funding from the UAB Center for AIDS Research K12 funding by NIH/NHLBI, which facilitated my transition to a Tenure-Track Assistant Professor in the Heersink School of Medicine — Division of Gerontology, Geriatrics, and Palliative Care. This project is an epidemiology study that focuses on the cognitive trajectories as it relates to vascular dysfunction in men living with human immunodeficiency virus (HIV) in the Multicenter AIDS Cohort Study (MACS). I have also received pilot funding for another epidemiology project examining frailty clustering as it relates to cardiometabolic outcomes in older adults living with HIV. Finally, I received funding from the HIV and acquired immunodeficiency syndrome (AIDS) Research Consortium (NIH/NIA) for a pilot exercise trial in older adults living with HIV.

Right now, most of my work focuses on the impacts of exercise on vascular and cognitive health in older adults living with HIV. I received an NIH/NIA Career Development Award (K01AG086063; NCT05965518) to examine the impact of high-intensity exercise to combat vascular and cognitive dysfunction in older adults with HIV who have neurocognitive impairment. I am also a co-investigator or consultant on several grants (NIH and Foundations). Broadly, my work has the potential to identify the underlying links between vascular and cognitive dysfunction, while using exercise as medicine for older adults, specifically older adults living and aging with HIV. Additionally, I have won numerous awards related to my work, but one that I am most proud of was being in the inaugural cohort of researcher to be inducted into the L.C. Dorsey Research Honor Society for my work in minority health and health disparities. Lastly, I have published nearly 30 peer-reviewed manuscripts, given

invited presentations, and applied to other distinguished training programs (e.g., UCSD Sustained Training in Aging and HIV Research Program [NIH/NIMH], HCSRN-OAIC Multiple Chronic Conditions Scholar).

As I continue to build my lab, establish myself as an independent researcher, and mentor future researchers, I will forever carry with me the skills and knowledge that I gained from my time as a Smith Scholar. Being part of the program has been invaluable in preparing me for this journey that I have been on.

## Conclusion

The Smith Scholars Program's curriculum covers areas a variety of disciplines and research topics cardiovascular epidemiology, biostatistics, health disparities, minority health, responsible conduct of research, scientific writing, and scientific presentations. Importantly, the curriculum is strengthened through individual research mentoring, career coaching, and collaboration opportunities between the scholars and mentors to produce scientific manuscripts and abstracts for peer-reviewed journals and national conferences. The benefits of participation in the Smith Scholars Program include memberships in scientific organizations, opportunities to contribute to research studies, mentorship from senior epidemiologic, data science, and population health researchers, career guidance from faculty, and an annual stipend (Box 1).

Scientific and professional development programs offering additional training in epidemiology and population health for doctoral trainees are notably limited. Existing programs, such as Stanford's R25 initiative (Population Health Aging Research—Advancing Health Equity and Diversity (PHAR-AHEaD)), predominantly cater to undergraduate students rather than doctoral candidates. There is a scarcity of programs specifically tailored towards predoctoral trainees seeking supplemental training and experience beyond their primary disciplines at their home institutions. We highlight the exceptional nature of a program like the Smith Scholars Program, which provides direct social, scientific, and professional support, all of which have been instrumental in fostering the scholars' success.

The opportunity for predoctoral trainees to complete additional research training outside their primary discipline is a rare occurrence in doctoral programs. This unique characteristic of the Smith Scholars Program distinguishes it from conventional programs. The Smith Scholars Program builds off the framework of summer research experience for undergraduate programs but is extended for 2 years with hands-on virtual training for a chosen research project. This aspect of the Smith Scholars

Program underscores its innovative approach in providing comprehensive and interdisciplinary training for predoctoral trainees in cardiovascular epidemiology, biostatistics, and health disparities and minority health. Overall, the program has directly contributed to several scholar's research trajectories including emphasizing the importance of team and collaborative science and creating new passions that motivate trainees to switch their field of focus for their next stage of career. The Smith Scholars Program is a pillar of success and serves as a framework for other programs to address not only health-related outcomes and disparities, but also, disparities in educational research training for early career trainees that are minorities and in regions that have less opportunities.

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## Declarations

**Ethics Approval** Not applicable.

**Consent to Participate** The authors agree for their personal narratives and views of the Smith Scholar's program to be published.

**Consent for Publication** The authors agree for publication if accepted.

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