WSSU Biomedical Research Infrastructure Center

BRIC Bulletin

A Year in Review

HIGHLIGHTS

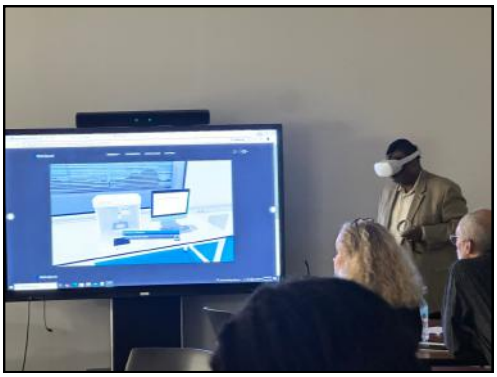
ITEC Regional Update Meeting

Winston-Salem State University's ongoing work in regenerative medicine continues to make significant strides through its Piedmont Triad Engines collaborative. Faculty-led projects are pushing the boundaries of cell culture innovation using customized media formulations and small molecule supplements. Researchers have demonstrated enhanced cell viability, proliferation, and reduced oxidative stress in hepatocytes, neurons, fibroblasts, and heart cells—highlighting the promise of the UM1 media system as a viable and ethical alternative to animal-based models. Collaborative efforts across departments and with external partners such as WFIRM and ThermoFisher have also opened doors to commercialization pathways and new training opportunities for students.

Beyond the lab, the program's regional engagement has deepened through initiatives like the NC Science Festival, Essentials science courses, and workforce development training. These efforts not only expose students to cutting-edge biotechnology but also build sustainable pipelines for STEM careers across North Carolina. With integrated research, education, and outreach, the PTRME program continues to position itself as a leader in regenerative medicine innovation and community impact.

Building Partnerships

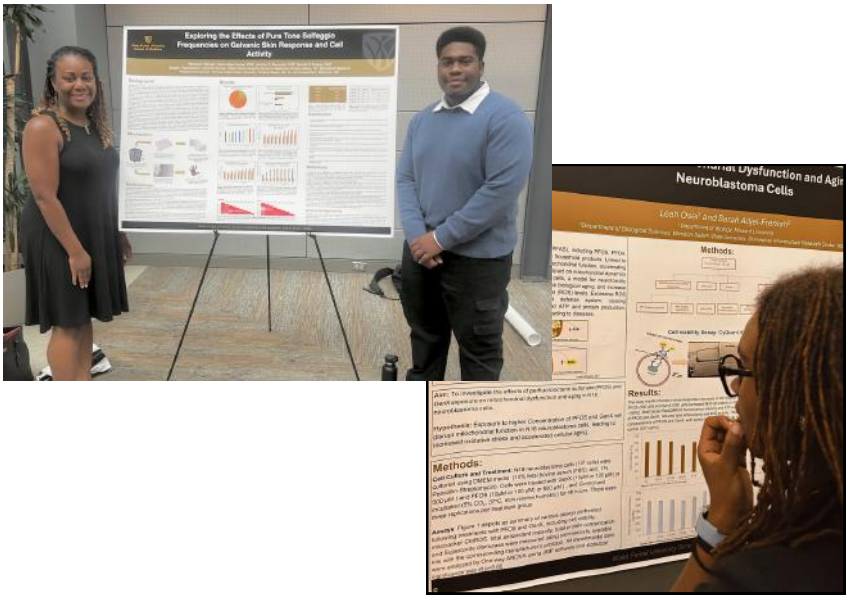
BRIC members associated with Piedmont Triad Regenerative Medicine Engine recently had an opportunity to learn about resources within Forsyth Technical Community College. A workshop at the Strickland Center provided updates within the PTRME collaborative and also allowed partners to observe scientific equipment, including an electron microscope and bioprinters. This allows for further networking and opportunities to increase workforce development within the Engine grant.



Winston Salem State University is a part of the HBCU Health Equity Data Consortium that focuses on health equity , advancing health disparity research, and improving data equity for historically marginalized populations. On June 13, 2024, a HBCU HEDC Partners Appreciation Conference was held, where the WSSU team was recognized for their work. The PI for the project is Dr. Tennille D. Presley; Co-Is include: Drs. Jill Keith, Cynthia Williams-Brown, and Dr. LaVie Leasure; the program coordinator is Ms. Marian Booker.

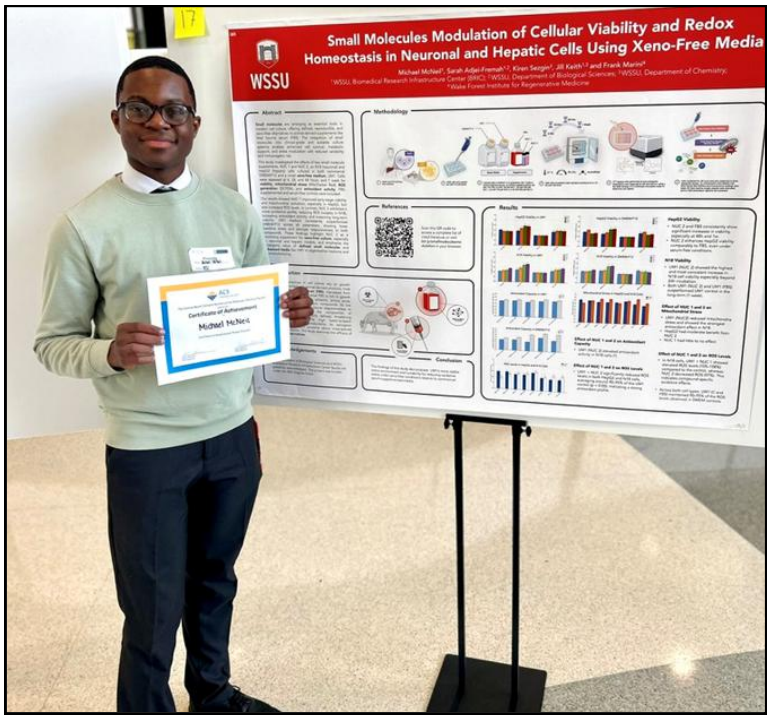
Research Poster Presentations

On April 9, 2025, undergraduate researchers presented their recent findings at the ACS Poster Vendor Night hosted by the NCA&T + UNCG Joint School of Nanoscience and Nanoengineering (JSNN). Presenters had the opportunity to have their posters judged by local faculty, including several members of the BRIC team. Research from the BRIC team was recognized at this event for its exceptional methodology, promising findings, and engaging delivery.



On July 25, 2024, scores of student researchers in the 2024 ENGAGED research program gathered at the Wake Forest Biotech Place to present the findings of that summer's scientific research conducted under the direction of noted BRIC faculty Drs. Sarah Adjei-Fremah, Tennille Presley, Ryan Fitzgerald, and Jill Keith, among others.

The Emerging Researchers Network (ERN) Conference was held in Atlanta, GA from April 4-6, 2025. Undergraduate researchers (Trinity Pratt (Adjei Fremah) and De'Lon Nowell (Presley)) under the direction of Drs. Sarah Adjei Fremah and Tennille D. Presley presented posters that showcased their research findings.



Michael McNeil, a researcher at BRIC, earned second place in the undergraduate presentation division at the 23rd Annual American Chemical Society Poster Vendor Night, hosted by the Joint School of Nanoscience and Nanoengineering. Under the mentorship of Dr. Sarah Adjei-Fremah, his research investigated the effectiveness of xeno-free alternatives—including small molecule supplements and xeno-free media—in replacing traditional cell culture protocols for brain and liver cells.

Dr. Keith represented WInston-Salem State University at the 2025 HBCU Engage Convention, building connections and establishing research collaborations.

Congratulations to Dr. Keith and Dr. Adjei-Fremah for receiving a travel award to the 2025 HBCU Entrepreneurship Empowerment Conference at Howard University.

Lab Experiences: Outreach

Staff from BRIC partnered with WFIRM to host a workshop on advanced cell techniques this March. Over 15 students joined professionals in our organization to learn about cell culture techniques, working with xeno-free media and small molecules, and performing live-cell imaging with Incucyte.

On July 18, 2024, the BRIC team hosted a group of local elementary- and middle-school-aged students for a special tour of WSSU's research facilities and hands-on demonstrations with faculty and staff. The aim of this field trip was to expose young learners to a variety of scientific perspectives (from cell biology to astrobotany) and facilitate engaging discussions with real researchers in the lab.

On July 23, 2024, student researchers in the 2024 Enhancing Undergraduate Education and Research in Aging to Eliminate Health Disparities (ENGAGED) summer research program accompanied BRIC faculty and staff to tour the cutting-edge facilities and innovative projects of the Wake Forest Institute for Regenerative Medicine (WFIRM). Students explored recent work outputs and practiced cell culture techniques under the supervision of Kathleen Benson and Alfredo Perez.

Meet the BRIC Staff

Shannon Byrne serves as the Research Technician for BRIC. She holds a Master of Science in Biomedical Science from East Carolina University and a Bachelor of Science in Biology from Methodist University. Passionate about laboratory work and experimental research, Shannon has cultivated strong expertise in mammalian cell culture. While she does not focus on a single specific project, she actively supports multiple research efforts across the center. Currently, she is collaborating with several faculty members on the Universal Media Project. Always eager to expand her skill set, Shannon enjoys learning and applying new techniques and assays in the lab.

Michael McNeil is a research assistant at the Biomedical Research Infrastructure Center (BRIC) and a 19-year-old aspiring medical student. An alumnus of Arizona State University, Michael holds a bachelor's degree in biological sciences with a concentration in cells, genetics, and developmental biology. Michael's work at BRIC lies at the intersection of protocol optimization, cell culture, and public health. His current project, under the direction of Dr. Sarah Adjei-Fremah, investigates small-molecule alternatives to fetal bovine serum—a widely used but controversial xenogenic additive in traditional cell culture media.

Jodi Laguardia is the program manager for several projects at BRIC. She holds two bachelor's degrees from NC State University in Animal Science and Zoology. Her career path eventually led her to earn a Master of Arts in Teaching from Winston-Salem State University. After eight years of teaching middle school science, she now leverages her organizational skills and STEM outreach experience to support various initiatives within the BRIC department.

Currently in the Lab

Dr. Adjei-Fremah's current focus has been on optimizing xeno-free media supplemented with small molecules for culturing hepatocytes and neuronal cells. This work has involved three undergraduate students and our dedicated research associate, Michael McNeil.
She also assisted in student presentations including the 2025 Emerging Researchers National (ERN) Conference in Atlanta, WSSU Scholarship Day, and the 23rd ACS PVN session at JSNN.

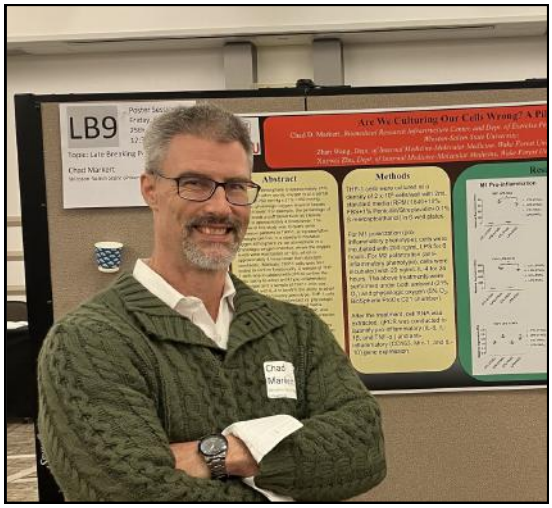
DR. SARAH ADJEI-FREMAH

Dr. Fitzgerald is a postdoctoral research associate in the labs of Jill Keith (Winston-Salem State University), Tony Reeves (Wake Forest School of Medicine) and Kiran Sai (Wake Forest School of Medicine/Atrium Health Wake Forest Baptist Hospital).His current research at WSSU focuses on developing and testing new compounds that can cross the blood-brain barrier and interact with key brain receptors involved in dopamine signaling. Some of these compounds show promise for treating conditions such as cocaine use disorder and age-related decline. Additionally, he is involved in research at the hospital where he helps design and produce new brain imaging agents for PET scans, including both experimental and clinical tracers used in patient care.

DR. RYAN FITZGERALD

DR. JILL KEITH

Jill J. Keith, Ph.D. conducts research related to central nervous system diseases and disorders and is currently developing molecular probes to study the brain, therapeutics to address aging, and working towards chemically defined cell media. She is the site PI for faculty and student development training grants, the Piedmont Triad Regenerative Medicine Engine grant, and serves on the Executive Committee for the NC Consortium for Health Equity Data.



BRIC member Chad Markert, PhD presented a portion of his Excellence in Research (EiR) project at the Society for Leukocyte Biology annual meeting. Dr. Markert is interested in how oxygen levels in cell culture incubators affect a wide variety of cellular outcomes, such as inflammation.

DR. CHAD MARKERT

Dr. Presley is a Professor of Physics in the Department of Chemistry at Winston-Salem State University. Her research focus is to provide a better understanding of contributing factors to vascular dysfunction, blood disorders, and free radical production as they relate to overall functional health. Dr. Presley utilizes biophysical approaches that expand into the realm of physics, regenerative medicine, music and biology as well as data science. Her goal is to utilize her training in personalized medicine to minimize the detrimental effects of diseases.

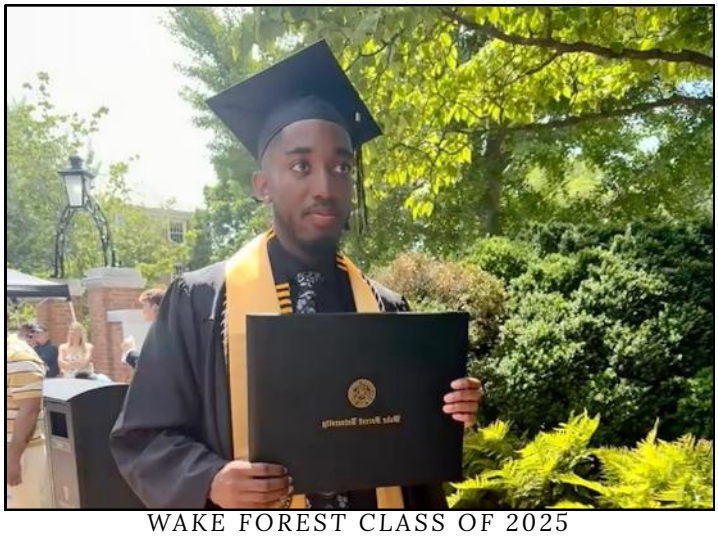
DR. TENNILLE PRESLEY

Dr. Kiren's research continues to make strides in both cancer therapeutics and regenerative medicine. His team is evaluating nucleotide analogues like 5-Azacytidine for their potential to promote cell growth and reactivate silenced tumor suppressor genes. In a parallel project, undergraduate students in his lab synthesized novel heteroaromatic compounds—specifically triazole-containing acetylcholine derivatives—with potential applications in stem cell modulation.

DR. SEZGIN KIREN

DR. ZHAN WANG

Dr. Wang is a newly recruited Research Assistant Professor at BRIC. His expertise spans stem cell biology, 3D printing, immunometabolism, and mitochondrial biology. Currently, he is focused on using human-induced pluripotent stem cells (iPSCs) to generate heart cells and heart organoids as a testing platform for newly developed universal culture media or candidate drugs for longevity and anti-cancer applications, helping to bridge the gap between preclinical and clinical research.



WAKE FOREST CLASS OF 2025

From Lab to Grad

Elqanah Awkward

"My experience at BRIC has been amazing these past two years. I have had amazing mentors who further developed my love for biology and chemistry. Additionally, I have had the opportunity to attend many conferences and travel across the country to present my research, including places such as Long Beach, CA, and Seattle, WA. Starting in August, I will be attending Howard University to obtain my Doctor of Physical Therapy degree."

Undergrad in the Lab

"My name is Shaniya Myles, and I am currently pursuing a degree in General Biology at Winston-Salem State University. My goal is to earn a PhD in Molecular Medicine and Translational Science (MMTS) at Wake Forest, with a focus in a career in regenerative medicine. When I'm not pursuing my education, I enjoy spending time with my Husky-Chihuahua mix, baking, and working at Quest Diagnostics Laboratory."