Nashville Medical News

VUMC's Aspirnaut Program to Install Science Lab at Wynne High School in Arkansas

Mar 03, 2023 at 01:08 am by Staff

A chemical biology research lab fit for an academic medical center is being installed at Wynne High School (WHS) in Wynne, Arkansas, as part of a pilot project of Aspirnaut STEM pipeline at Vanderbilt University Medical Center (VUMC).

Aspirnaut, a K-20 STEM (Science, Technology, Engineering and Mathematics) Pipeline for Diversity and Wellness celebrated its 15th year in 2022. The goal of the outreach initiative is to increase the diversity and wellness of the STEM workforce by partnering Aspirnaut at VUMC with rural schools.

One of the nation's leading STEM pipelines, Aspirnaut has helped a diverse group of 162 high school students from 25 states, including 72 students from Arkansas, to pursue their dreams of a career in science. Sixty-three students have now graduated from top-tier colleges, with 70% receiving or working toward a master's, MD, or PhD degree or directly entering the STEM workforce.

Aspirnaut made history in 2007 in rural Grapevine, Arkansas, by equipping the first school buses with Wi-Fi and building a curriculum for learning. Over the past 15 years, the program evolved, bringing rural high school students to VUMC for summer research internships. That program has received national recognition and was featured on *NBC Nightly News* in August 2022.

Now, Aspirnaut is planning to take its real-time science discovery from the university setting to the rural classroom, according to Aspirnaut scientific director and co-founder Billy Hudson, PhD.

"Students will gain experience in discovery science in their high school lab as junior members of a research team at VUMC, using invertebrate animal models," he said. "They will initially work on biological problems in medicine. Later, their work could extend to research topics in agriculture and the environment. This novel initiative will impact more high school students and influence middle and elementary students. I don't know of any chemical biology laboratory being placed in a rural school."

Billy Hudson estimates the collaboration of scientists at VUMC with teachers, students and officials at Wynne High School will take about a year and a half to get into motion, with initial setup provided by Aspirnaut. Full implementation will require funding from co-sponsors, grants, foundations, and gifts.

"This will give high school students from rural and diverse backgrounds research experience on a question that hasn't been answered," he said. "It will also put an animal model into the system for their research — flies, worms, brine shrimp. Their hands-on experiences will enhance science education even down to the kindergarten level as they observe this prestigious group of students in their white lab coats."

Wynne, with roughly 800 high school students, is a small town with just 8,274 residents in the middle of agriculture country, primarily rice and soybeans. The research lab will connect teachers and an initial cohort of 12 Wynne High School students to scientists at VUMC, specifically the Center for Matrix Biology.

"Teaching high school science normally only provides students a glimpse of what a future career in science might look like. With this partnership between VUMC and WHS, students will be able to actually experience science first-hand, on a level never before made available to them," said WHS Science Teacher Clay Spann.

"A student's experience with the program has the potential of setting career paths. Our goal is to afford the students participating in the Aspirnaut program at WHS the skills necessary to perform scientific research, to provide an understanding of the expectations of conducting pure research and to create a "Science Team" to which the students would belong," Spann said.

Wynne Public Schools Superintendent Kenneth Moore, EdD, a Wynne native, said the opportunity to partner with VUMC is a significant one for his students.

"Growing up in Wynne, I've always been proud of the accomplishments our school district has achieved," Moore said. "The opportunity to partner with VUMC is one of, if not the, greatest opportunities we could ever be a part of. As superintendent, I cannot thank VUMC enough for allowing us to offer our students a way to expand their experiences in science through the Aspirnaut program. We, as a school district, cannot wait to see the program grow into what we all know it will and we thank VUMC for that!"

Aspirnaut's executive director and co-founder Julie Hudson, MD, MA, said "the students can learn to sequence RNA and DNA from various animal cells by asking important unanswered questions as junior members of a research team at VUMC. This will bring interdisciplinary research to the classroom so the kids can experience it and begin to dream of science careers."

In addition to guided scientific discovery, Aspirnaut provides professional skills development and self-discovery — skills needed for thriving in competitive STEM fields. These include activities in scientific communication,

ACT/SAT prep, long-term mentorship, psychological thriving skills, wellness training and college counseling.

A critical part of the holistic approach is Billy Hudson's 'Why?' "I grew up in poverty in rural Arkansas. I am a survivor of childhood abuse. Because of teachers and professors, I can come here and pay it forward," he said.

"I am excited because I have been working for years trying to figure out what model to put out there for people like me. This is a pilot study to show what can be done to bring university research to students so they can be on a science team as well as basketball and football teams. The uniform is a lab coat. I believe we can set up something truly unique for students and the community."

The *Aspirnaut K-20 STEM Pipeline for Diversity and Wellness* was co-founded in 2006 by Dr. Billy Hudson, world-renowned scientist, and Dr. Julie Hudson, pediatric anesthesiologist and national leader in healthcare. In 2009, the *Aspirnaut Summer Research Internship Program* was launched at Vanderbilt University Medical Center. A residential, hands-on experience for high school and undergraduate students, participants engage in a full-time research experience as a member of a team of scientists and in professional and personal skills development. Theirmission is to increase STEM achievement and the numbers and diversity of the STEM workforce. The program provides opportunities in STEM for talented youth from rural and diverse backgrounds, empowering them to effect positive change in themselves, their families, and communities for generations to come. Persistence in STEM courses of study, pursuit of advanced degrees, and entry into the STEM workforce exceeds national norms. Highly acclaimed as one of the nation's leading STEM diversity initiatives, *Aspirnaut* has more than a decade of outstanding data and a track record of success.

For more information, www.aspirnaut.org
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