



# SPECIAL DELIVERY

HOPKINS DOC TIM AMUKELE HAS A SOLUTION FOR TRANSPORTING BLOOD IN INFRASTRUCTURE-CHALLENGED POOR NATIONS: DRONES.

BY MICHAEL YOCKEL

PHOTOGRAPH BY CHRISTOPHER MYERS

**T**wo years ago, Tim Amukele fielded a curious proposal from a medical student referred to him by a colleague. At the time, Amukele—a pathologist, who, among his multiple Johns Hopkins Medicine-related duties, directs clinical laboratories at Hopkins-affiliated hospitals in both Malawi (South-east Africa) and Uganda (East Africa)—was pondering the conundrum of how to transport blood samples safely, effectively and as fast as possible from a rural collection point to a distant testing facility in poor nations with inadequate infrastructure. Independently exploring similar territory, the med student had a brain wave: Deliver medicines via drones to remote areas in India.

“I thought it was the dumbest thing I’d ever heard,” Amukele recalls with a laugh, sitting in the café lobby of the Alpha Commons Building on Hopkins’ Bayview campus, where he oversees all clinical labs. “I thought, ‘People need roads, they need clean water—they don’t need drones.’ This is absolute nonsense.”

Still, Amukele agreed to hear out the student, and, in preparation for their chat, investigated the concept of drone delivery. “I found that drones were cheap enough that they made sense,” notes Amukele, 40. “It wasn’t just this shiny new thing to play with.” Additionally, he learned that, while drone transportation of medicines had

been studied, no practical program had been implemented.

Now intrigued with the possibilities, Amukele worked with a team of engineers to design a drone, and, along with the med student and another Hopkins pathologist, completed a proof-of-concept study in 2015 by flying a battery-powered drone laden with blood samples (drawn from healthy volunteers) for six- to 38-minute missions at a site an hour north of Baltimore; for a control group, blood samples drawn from the same volunteers were driven to the test site but not sent airborne. A battery of

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subsequent tests on the drone-flown and vehicle-driven blood samples showed no appreciable differences. Concept proved.

Amukele envisions broad applications, both in Africa and domestically: “In poor

countries, it will provide access where there is none. A drone is a lot cheaper than building and maintaining a road. In places like the U.S. and Europe, it will be about improving the quality of care. For example, if someone needs a certain blood type and it’s not available in a local blood bank like Bayview’s, then it has to be driven here from some place like New Jersey, and if there’s a traffic jam, we call the state police and they’ll drive it down.” With a drone, the blood—or, potentially, medicines—can be flown in immediately.

Working in (and for the betterment of) Africa comes naturally to Amukele. Although born in Toledo, Ohio, to Nigerian parents, he grew up in Nigeria after his family returned there when Tim was two. He entered college in Nigeria at 14, but then relocated to the U.S. shortly thereafter to attend the City University of New York, where he earned his undergrad degree in biochemistry while falling a few credits short of a dual degree in music, an interest since boyhood. From there, he secured his medical degree at Yeshiva University’s Albert Einstein College of Medicine, and, after a residency at the University of Washington Medical Center in Seattle, joined Hopkins in 2010.

In addition to his responsibilities at Bayview—where he also trains residents one-on-one in how to run labs—and in Africa—where he spends an average of 12 weeks annually—Amukele studies multiple myeloma at Hopkins’ mothership hospital in East Baltimore.

Amid all of this, he somehow finds time to pursue a parallel career in music, which dates to 8-year-old Tim’s stint in a quintet called the Heavenly Band Singers, which traveled throughout Nigeria performing American country and gospel songs. “We were a big hit,” Amukele remembers, grinning. “We had uniforms, we had groupies—the whole thing.” And he reluctantly forsook his degree in music only because he needed to decamp to med school. So it comes as no cosmic surprise that Amukele, a pianist, now writes, arranges and records music, both for himself and others.

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"I don't feel like I have a choice as far as music is concerned," he explains. "I feel like I must do it. And I've always been more interested in the creative part than in the performance part."

Accordingly, he composes music on commission, often for choral groups, and, about a year ago, released *Night Songs*, a CD of thoughtful, soulful ballads and midtempo tracks. To date, he estimates that he has completed somewhere between 200 and 300 songs, 70 percent of which use others' lyrics.

"Lyrics are not my gift," he admits. "I have an appreciation for them—they speak to me—but I can hear music in existing words." That accounts for the presence of songs on his album adapted from literary works by Langston Hughes, Ursula Vaughn Williams and Paul Lawrence Dunbar, as well as two covers: "Day Is Done," by famously melancholy English singer-songwriter Nick Drake, and jazz genius Thelonious Monk's classic "Round Midnight." At the moment, he's working on a song cycle based on poet Kahlil Gibran's *The Madman*.

Not forgetting the drone project. Successful follow-up test flights have been conducted since the 2015 proof-of-concept study, and Hopkins has hired an engineer full time to help get a real-world drone-delivery program off the ground. "There's a lot of interest in it," Amukele says, "but everyone wants someone else to go first, and then they can learn from someone else's mistakes." (In fact, Rwanda, in East Africa, began delivering blood for transfusions via drones in the western half of the nation in October, with plans to expand the service to the east next year.)

"We have sites here in the U.S. and internationally where we've gotten almost all of the permissions we need" to implement a drone-transport project, he adds, one of which might soon come to fruition. Although Amukele's not yet at liberty to name the specific country, other than to say it's in West Africa, he confides that "we have permission from the minister of health and the department of defense—all the way up. I'm excited about that." □