From pre-NASA days to Apollo, the struggles of black women in the early space program rarely came to light. Until now.

by Korey Haynes
In the heady days of the space race, the Mercury Seven astronauts were celebrities, and the Moon’s silver face seemed, for the first time in human existence, close enough to touch. For many, space was a tantalizing promise of a wonderful future, beyond the strife of an increasingly divided Earth. For others, supremacy in space was the answer to the Cold War. And for yet others, space was a sign of profligate spending of time and energy on dreams, when reality desperately needed America’s attention.

NASA achieved its most spectacular first steps in those days, making heroes out of men and women who dared to push harder, dream bigger, and be smarter than anyone before them. Those moments created titans in American history, such as rocket pioneers Robert Goddard and Wernher Von Braun, or astronaut adventurers John Glenn and Neil Armstrong.

But many of the actors in this play remain hidden in the wings. Now, decades after the work that should have made them legendary, the black women who helped put the United States in space are finally having their stories told.

These women, though not the faces memorialized in crowded mission-control room photos or seen waving from catwalks before launching beyond Earth’s grip, were nonetheless stars in their own right. And one of the brightest was Katherine Johnson.

A HUMAN COMPUTER
Born in 1918 in White Sulphur Springs, Virginia, Johnson loved numbers as a child. She started college at West Virginia State University at age 15 and blew through the school catalog’s listed courses; her professor created new ones just for her. By 18, she had graduated summa cum laude with degrees in math and French. But career paths for black women were stark in the 1940s, even with a mind as sharp as Johnson’s. She taught school for more than a decade with a mind as sharp as Johnson’s. She taught school for more than a decade with a mind as sharp as Johnson’s.

She said the men she worked with exactly where and how to shoot Shepard into the sky so he would splash down safely in range of watchful Navy ships. By the time Glenn orbited Earth, mechanical computers were beginning to replace humans. But Glenn, fearless as he was, wanted his path checked and his life in the hands of someone he could look in the eye, not an unfeeling machine. Johnson was that person, matching the computer decimal for decimal. And when Armstrong, Buzz Aldrin, and Michael Collins left Earth for the Moon, Johnson used the powerful new computers to calculate their trajectory as well. By the time she retired in 1986, she had left her fingerprints on NASA missions from the agency’s first forays beyond Earth into the space shuttle era.

Johnson and her colleagues, Dorothy Vaughan and Mary Jackson, feature prominently in the new book *Hidden Figures*, by Margot Shetterly. The book, which came out in September 2016, is about to hit the big screen as a major motion picture. Johnson is the lead character, played by Taraji P. Henson of the Fox television show *Empire*; Octavia Spencer and Janelle Monáe round out the cast as Vaughan and Jackson, respectively.

Johnson is arguably the most famous of a group of black women Langley Research Center hired to perform calculations during World War II. They were known as the West Computers because they worked in the segregated West Area of Langley. Toiling as brainy beasts of burden, these women — and their white counterparts in the East wing — took math problems parcelled out by engineers and solved them with lightning speed and meticulous accuracy.

Women who showed particular skill and interest moved out of the computing pool to work directly with specific engineering groups. This allowed Johnson and others to break free of the physical walls segregating them by race and gender from the rest of the NASA team. Her work earned her NASA achievement awards and landed her in lists of both women’s and African-Americans’ success stories. But her work also landed men on the Moon, and she deserves — and is finally getting — recognition beyond these lesser-known lists. So why are we only hearing her story now?

“She’s almost 98, and she’s still alive and able to tell her own story,” Shetterly says. “A lot of people have passed away, and so she’s around in a moment when we’re looking for people like her. You open the news, and there are a lot of really depressing stories out there. And this is a positive African-American story, it’s a positive female story, it’s a positive American story, it’s a great space story.”

Johnson’s story, in fact, seems...
almost tailor-made for the big screen. The roots of her computing legacy reach from World War II through the looming threat of the Cold War and the strife and successes of the civil rights movement, hurtling through all of it in the pursuit of space dreams. She was a natural fit in an agency that broke scientific barriers and never stopped asking questions — except that Johnson and her fellow computers were breaking racial as well as scientific ground.

In 2015, President Barack Obama awarded the real Katherine Johnson the Presidential Medal of Freedom. And in May 2016, Langley, where Johnson spent her NASA career, dedicated a building in her name. NASA dedicated the new research facility on the 55th anniversary of Glenn’s victorious return to Earth, but that milestone is only one small piece of the puzzle of “why now?”

“There’s some kind of magic other thing,” Shetterly admits. “I have no idea, but it just is happening of its own accord.”

THE SILVER SCREEN TOUCH
Shetterly is one of the people who has long known not only Johnson’s name, but many women like her. Shetterly grew up in Hampton, Virginia, in Langley’s backyard. Her father worked at Langley as a research scientist. If anything, it took her this long to tell the women’s story because for many years, their work didn’t seem like much of a feat.

“I feel like it was probably one of the greatest gifts in my life just growing up thinking this was normal,” she says. “There was nothing to me that was out of the ordinary about either living in a community with a lot of scientists or living in a community with a lot of African-American scientists or living in a community with a lot of female scientists and engineers and such. It seemed totally normal.”

It wasn’t until Shetterly explained the West Computers to her husband — and witnessed his wonder at their role in history — that a switch flipped in her mind. She began asking around for the women’s stories and realized there were easily enough to fill a book.

She hadn’t even finished writing that book when film producer Donna Giglotti optioned the rights for a movie, based on only Shetterly’s 50-page book proposal. Screenwriter Allison Schroeder took the proposal and many of Shetterly’s primary source materials and got to work. She focused on three of the women who shine particularly brightly in Shetterly’s research: Johnson, who was central to the leading missions of NASA’s heyday of space flight; Jackson, an energetic young woman who smashed barriers in her advance from computer to engineer; and Vaughan, one of NASA’s first black managers, who ran the segregated West Area Computing Division.

Schroeder was excited to tell the story of these women against the backdrop of the most exciting science program in U.S. history. With grandparents who worked for NASA, and a love of numbers and strong women all her own, Schroeder promises, “I was born to write this.”

But she had her work cut out for her. Unlike the popular Apollo 13 film — which relied on hours of recorded conversations and minute-by-minute accounts of the event for screenwriters to insert directly into the movie about a single, compact event — scant evidence existed from which Hidden Figures could draw. While Johnson’s work is well preserved in history, she recalls her day-to-day interactions only by memory. And in a story that spans decades — Shetterly’s book opens in the height of World War II and follows Johnson until her retirement — the movie is obliged to condense multiple historical people into a few characters, the better for the audience to track and connect with. For instance, Kevin Costner plays a character stitched together out of real-life details from multiple flight directors and administrators in NASA’s history.
“There’s always a balancing act,” says Bill Barry, a NASA historian who worked as a consultant for the film. His team delighted in replicating the halls of Virginia’s Langley Research Laboratory in a disused hospital in Atlanta, right down to the art on the walls. But they were also patient with certain necessary adjustments made in order for the film to tell a cohesive story out of the jumble of real people’s lives.

While the film was never meant to be a documentary, Barry is satisfied that the film will bring the key players and events to life.

A QUESTION OF HISTORY

Another part of the balancing act, not so dissimilar from the question the women themselves contemplated, is how much to talk about the challenges facing three black women in the ‘60s, racing for the Moon when so much stood in their way down on Earth.

“We really don’t even deal with race,” observes Henson, who plays Johnson in the movie. “Because you know what was going on in the ‘60s…. We deal with how to rise above it. At the end of the day, how do we get this man on the Moon?”

Barry agrees. “They were focused on the mission,” he says. “So if you had the skill set to do the mission, they put you to work, and who cares about the rules.” But Barry also admits there were rules even NASA wouldn’t break, such as segregated restrooms and a designated cafeteria area.

Duchess Harris, a professor of American studies at Macalester College, argues, “That’s not meritocracy.” Harris has written her own book about the West Area computers, Hidden Human Computers. Like Shetterly, she has a personal connection to these women: Miriam Daniel Mann, one of the Langley computers, was her grandmother. She points out that the land Langley stands on was, until 1950, a plantation. While NASA extended science jobs to black employees, the segregation of the times meant race was still a constant presence in their lives.

Many NASA employees took classes to extend their already advanced technical knowledge, but African-Americans were forbidden from many of the local colleges because of segregation laws. The nearby Hampden Institute, a well-respected black university, supplied much of the desired coursework.

Compounding the problem, NASA’s standard position for hiring women was as a computer — a subprofessional position that paid half an engineer’s salary, even for men and women with identical degrees. While NASA gave a few black women an important foothold, the deck was very much stacked against them.

But Henson is convinced that the film doesn’t need to discuss race — or gender — to make powerful statements about representation. “As I’m doing my research,” she recalls, “I see all of this NASA footage, and I don’t see any women, not even white women. There was a west wing of computing and an east wing of computing, and they’re just erased from history…. It blows my mind that little girls don’t know that they can do this.”

THE SPACE WOMEN OF TOMORROW

Spreading the women’s message is both an important first step, and an incredibly rewarding one. Many hope that seeing Johnson on the big screen will trumpet her name far beyond NASA write-ups and awards.

But the Hollywood story, and even
Shetterly’s more in-depth book, are only narrow peeks into the rich history of the women who provided the bedrock of NASA’s endeavors. Last year, Nathalia Holt released *Rise of the Rocket Girls*, about the women of the Jet Propulsion Laboratory, whose calculations guaranteed the success of rocket flights and planetary missions. Holt credits their legacy to JPL’s retaining more women-powered space teams than elsewhere in the NASA family, where female team leads are hard to come by. But her book tells the story of only one center and its largely white team. Elsewhere, black women struggled up a steeper hill.

Harris continues her own study of the women of Langley, her research finding a home in museums and classrooms instead of in popular media. She hopes targeting children with these women’s stories will provide role models for kids who often don’t see scientists who look like them.

Speaking for NASA, Barry agrees. “We hope [the *Hidden Figures* film] encourages more young people to go into the field. From our perspective, there’s lots of fallout benefits from telling this kind of story.”

Those benefits are desperately needed. The space science fields, engineering in particular, suffer acutely from a lack of women and minorities. While the earliest computer programmers were exactly these human computers of NASA — adapting their math from pencil and paper and bulky calculator to computer punch cards — women’s participation in computing fields flagged as the field advanced. And less than a hundred African-American women have earned Ph.D.s in physics.

Ever.

The reasons for this are manifold and complex, but it is a self-perpetuating problem. With so few black women in these fields, even those who complete advanced degrees can feel unwelcome at their work and find themselves treading ground not so dissimilar from Johnson’s days, the social barriers less visible but still extant. And seeing few black women in those workspaces can discourage young potential scientists, who see no one like themselves to whom they can aspire.

Chanda Prescod-Weinstein, a professor of physics at the University of Washington, counts herself among the few black women with physics Ph.D.s. “Our institutional bias against black women scientists is so strong that it is literally hard for people to imagine I exist,” she says. “I overcame it. The people who hired me overcame it.”

She points to the “nonlinearity” of progress in STEM diversity. (STEM refers to the disciplines in science, technology, engineering, and math.) While Johnson and the other *Hidden Figures* characters worked in a team with other black women, Prescod-Weinstein says that she was 13 years into her research before she found the chance to
work with another woman on a project. “This film offers us an opportunity to really reflect on how science was done then, and why community took the structure it did, including the fact that because of segregation, sometimes it was easier for people to create community because they were forced into it,” she says. “Now the segregation is less visible or less present, but I think a lot of times just less visible, and it can be harder for people to find community.”

Studies show that as early as middle school, girls and minorities are opting out of science not because they enjoy it less or even see themselves as less capable, but because they don’t see science as something that is for them.

Understanding that not only can black women excel in space science, but they have been doing so all along, could make a huge impact on the next generation of scientists. “It really highlights the importance of not separating the science from the history of how it was produced,” Prescod-Weinstein says.

Studies show that women are drawn to jobs that foster cooperation and have a clear impact, and that physics’ reputation for cold calculation turns many of them off at young ages.

“It is not just the faces of Langley’s human computers that are important, but the ways in which they did their jobs.

“Somebody wants to know something,” said the 98-year-old Johnson, explaining her math skills in a speech at her own Langley dedication ceremony. “Help them. Help anybody you can help.” She saw her love of math as a way to further America’s dreams. After her retirement, she spent decades traveling to classrooms and meeting school groups, encouraging more women to follow in her footsteps.

“She would always include other people,” says Henson, who has come not only to admire, but to adore the woman she portrays. “Because she knows it’s teamwork. But it was her calculations.”

“If you’ve done an answer to a problem … yours is the answer,” Johnson said in her dedication ceremony. And she is proud of her years of service: “When they pulled out a few notes to write down what I had worked on, the guy had 20 pages.”

Johnson said she was pleased to see the emerging pattern of recognizing women’s work, something she says men have long gotten credit for.

Prescod-Weinstein anticipates the film as “an opportunity to write history correctly, finally, about what has been the nature of black contributions to American intellectual history.”

For many reasons, the West Computers’ names are never likely to rise to the level of Neil Armstrong’s or Jim Webb’s renown. But the solutions were theirs.

Women like Katherine Johnson have always been part of the story. It’s high time we told it.
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