

Minds that Soar Above the Impossible

by Marsha Freeman and Dennis Speed

*The following is Part 2 of a review of both the current film *Hidden Figures* as well as the book *Hidden Figures: the American Dream and the Untold Story of the Black Women Mathematicians Who Helped Win the Space Race* by Margot Lee Shetterly. For Part 1, see [our previous issue](#).*

Feb 21—In 1987, economist Lyndon LaRouche, a candidate for the 1988 Presidency, wrote and released a thirty-minute television treatment called *The Woman On Mars*. Its title paid tribute to a 1929 film made by director Fritz Lang, *The Woman In The Moon*. It was a forty-year perspective for a possible direction for the United States space program. It was unique in the Presidential race of that year, and every year since.

The idea of *The Woman On Mars* or *The Woman In The Moon* turns out to have been not so unique as it has appeared to us in the past. That is the particularly useful feature of the recent movie, *Hidden Figures*. There is a little known story of intellectual courage at the very center of the United States space program that is now receiving merited attention.

When John Glenn stepped into his Mercury capsule in February 1962, sitting atop an Atlas Intercontinental Ballistic Missile, he undoubtedly recalled the very first test launch of an Atlas that the seven Mercury astronauts had witnessed—the rocket blew up in front of their eyes.

Many acts of courage, however, take place, not on television, but outside of public view, often with few or no witnesses, never to be acknowledged. These acts are often the most important in enabling the leaps a society makes in conquering its most daunting challenges. The



*Not all civil rights marches took place in front of the cameras. In this scene from *Hidden Figures*, Dorothy Vaughan's "West computers" transfer to new quarters to become an integral part of the new space program.*

black women "West Computers," as portrayed in the film *Hidden Figures*, and the women in the NASA program as a whole, had no lesser role to play in putting Americans into space and the first man on the Moon, than the astronauts whose lives depended upon them. Their courage was grounded in their brilliant minds, their self confidence, and their determination that the "social order" could be challenged, through what they could accomplish.

That courage, however, did not come from them as mere individuals. There was a social and institutional tradition of excellence out of which they "sprang." It had been invented in Lincoln's and Grant's America by post-slavery African-Americans and their non-Black allies in such organizations as the American Missionary Association. This educational movement, unacknowledged but fundamental to American intellectual life, starting in 1866 and extending unbroken through the 1930s, fostered that mental toughness, creativity and resilience. It was rooted in the Grant-era Recon-

struction and post-Reconstruction southern educational system's Hampton, Tuskegee, Fisk, Rust, and 490 other schools and Historically Black Colleges and Universities (HCBUs) that were created over the eighty years prior to *Hidden Figures*' area of concentration. In fact, Margot Shetterly's companion book, *Hidden Figures: the American Dream and the Untold Story of the Black Women Mathematicians Who Helped Win the Space Race* is, in its own way, as much a resurrection of the importance of these institutions as it is a re-discovery of the "human computers" upon whom it concentrates.

For example, author Shetterly usefully provides the background story of one of those women, the now-famous and NASA-celebrated Katherine Goebel Johnson, thus:

In 1933, Katherine entered West Virginia State College as a fifteen-year old freshman. . . . The school's formidable president, Dr. John W. Davis, was, like W.E.B. DuBois and Booker T. Washington, part of the exclusive fraternity of "race men," Negro educators, and public intellectuals who set the debate over the best course of progress for black America . . . James C. Evans, an MIT engineering graduate, ran the school's trade and mechanical studies program before accepting a position as a Civilian Aide in the War Department in 1942.

These and other wartime connections provided the conveyor-belt for qualified African-Americans, who had actually always been available, to serve their country at levels above the expectations of the institutions into which they were introduced. As Tuskegee Airman pilot instructor Daniel "Chappie" James, later to become the nation's first African-American four-star general, said, "My mother used to say: 'Don't stand there banging on the door to opportunity, then, when someone opens it, you say, 'Wait a minute, I got to get my bags.' You be prepared with your bags of knowledge, your patriotism, your honor, and when somebody opens the door, you charge in.'"

Of one of Katherine Johnson's teachers, Shetterly tells us:

On staff in the math department was William Waldron Schieffelin Claytor. . . . Just twenty-

seven years old, Claytor played Rachmaninoff with finesse and a mean game of tennis. He drove a sports car and piloted his own plane. Claytor's brusque manner intimidated most of his students, who couldn't keep up as the professor furiously scribbled mathematical formulas on the chalk board with one hand and just as quickly erased them with the other. He moved from one topic to the next, making no concession to their bewildered expressions. But Katherine, serious and bespectacled with fine curly hair, made such quick work of the course catalog that Clayton had to create advanced classes just for her.

Despite the fact that there was no apparent possibility for "career advancement" for an African-American woman in the sciences, Claytor insisted that he was preparing Katherine for a career in research, a career that did not yet exist! The space program, precisely because it was based on creating that which did not exist, was precisely where Katherine Johnson would find herself, because she *could* find herself there. She had been prepared for the future, which one can forecast, but not directly see, and space research was that future.

Kennedy's Apollo Project Creates the Future

When President John F. Kennedy announced that the United States would land a man on the Moon by the end of the 1960s, the leisurely pace of NASA's manned Mercury program was replaced with the all-out national drive to meet the President's deadline. New facilities, to train astronauts, build a new Statue-of-Liberty-sized rocket, run the test stand and wind tunnel tests to make sure it would fly, and develop the men and materiel to carry out the mandate, had to be created. The National Advisory Committee on Aeronautics (NACA) already had research and development and test facilities, in California, Ohio, and Virginia. They would be absorbed into NASA, which would add rocket research to the menu of their responsibilities.

These NACA centers could have been expanded to take on the new responsibilities of manned missions, but the leadership of the space agency sought instead to create new facilities. These, it would site in Alabama, Mississippi, Texas, Louisiana, and Florida. President Kennedy and the leadership of NASA saw the space program as a vehicle toward integration in the South.



John F. Kennedy Library

President John Kennedy inspecting the interior of Friendship 7 with John Glenn. Sending the first American into Earth orbit required the insight to “see beyond the numbers,” and invent a new mathematics. Astronaut John Glenn did not step into his Friendship 7 capsule until he had been assured that “human computer” Katherine Johnson had “checked the numbers.”

In all of these states, racial segregation was the law. Between 1882 and 1968, Mississippi led the nation in black lynchings, with five hundred thirty-nine that have been documented. Just in the years of Franklin Roosevelt’s Presidency, between 1933 and 1945, there were one hundred black lynchings in the South. But President Kennedy believed that “a rising tide lifts all boats,” and that venturing out into “this new ocean of space,” would open opportunities for the nation’s disenfranchised. Shortly after taking office, the President issued an Executive Order requiring federal agencies to hire minorities, and at the time, NASA was the fastest growing federal agency in the deep South.

Two years later, in Muscle Shoals, Alabama, during a celebration of the thirtieth anniversary of Franklin Roosevelt’s Tennessee Valley Authority, sitting beside President Kennedy on the platform was Alabama Governor George Wallace, who, in his inaugural speech four months earlier, had declared: “Segregation now, segregation tomorrow, segregation forever.” This was on May 18, just thirteen days after Wallace’s defeat by the civil rights’ Children’s Crusade in Birmingham, initiated by the Rev. James Bevel while Martin Luther

King, Jr. was incarcerated in the city jail, writing his “Letter,” now one of the most famous documents in American history. That movement had successfully integrated Birmingham stores and had defeated the infamous racist police chief, Eugene “Bull” Connor, after Kennedy’s White House had been made aware, including by the statements of world leaders, of the outrage registered in many countries at the pictures of police dogs, water-hosing, and the incarceration of seven-year olds.

In that speech, Kennedy asserted the principle of the sovereign authority of the Federal Government—through the policy of public improvements to promote the General Welfare of the nation as a whole—to be identical with the guarantee of the right to develop to all its citizens, regardless

of circumstance or ethnicity. Kennedy said that the Tennessee Valley Authority

stands for cooperation between public and private enterprise, between upstream and downstream interests, between those who are concerned with power and navigation, flood control and recreation, and above all, cooperation between the Federal Government and the seven states of this area... From time to time statements are made labeling the Federal Government an outsider, an intruder, an adversary. In any free federation of States, of course differences will arise and difficulties will persist. But the people of this area know that the United States Government is not a stranger or not an enemy. It is the people of the fifty states joining in a national effort to see progress in every state of the Union.

Progress, social progress through economic and technological progress, was the first and foremost reliable force for national unity. The public civil rights movement would put a national spotlight on racial dis-

crimination in this country, and the violent opposition to equal rights. Yet, there was something else: a national vision and sense of purpose, held by those at NASA, which would over time overwhelm all else in the service of its accomplishment. *Hidden Figures* and its companion book provide a more thorough description than is otherwise available, of that cultural shift in America, of its unbridled technological optimism. It was an intellectual “human rights movement”—the right to be creative on the very frontier of all human scientific knowledge—that these women scientists led, not through marching (though some did that as well), but by means of their accomplishments, a necessary and welcome complement to those marches.

Asked in an interview last December, carried by *inverse.com*, whether she thought the women in her history “saw a connection between their own work and the advancement of civil rights,” author Margot Shetterly replied, “Absolutely, there’s no question. They saw a very direct result. Their attitude was, ‘We’re here, we are doing this work, and we are helping our country advance because we are also opening the door for people like us.’” She continued, “They realized that everything they did would have an implication for future women.”

The Next Generation

Hidden Figures provides an opportunity, unlike Hollywood “special effects space movies” like “Gravity,” not only to acquaint two generations of Americans with the real heroes still in their midst, but to galvanize today’s United States past the desert of the Obama years—back into space.

On Jan. 7, Katherine Johnson’s great-grandson, University of Guam student Trevor Boykin, hosted a special screening of *Hidden Figures*, at the Micronesian Mall Theater. His purpose was to honor his now-famous great-grandmother, and to generate funds from the proceeds to go toward a Science, Technology, Engineering, and Mathematics (STEM) scholarship in her name. The event raised about \$1,000,000, and the two hundred in attendance were education officials and students of all ages.

NASA has sponsored a series of events to bring this previously unpublicized space history to the public. On Dec. 1, NASA kicked off what will be a year-long centennial celebration of the Langley Research Center, the real-life location of the events portrayed in *Hidden Fig-*

ures. An educational event, led by Administrator Charlie Bolden, included Octavia Spencer, who plays mathematician Dorothy Vaughan (and has been nominated for an Academy Award) in the film.

On Dec. 12, the Kennedy Space Center held a news conference with cast members from the film, which was shown live on NASA TV and the agency’s website. In January, after the film’s official release, NASA’s Glenn Research Center and Cuyahoga Community College took three hundred fifty students from fourteen local schools to see the film. After the movie, the students had the opportunity to participate in some science-related activities and hear from space professionals, including Dr. Christine Darden, retired from NASA. Darden worked in the same computing department depicted in *Hidden Figures*. She said, “We never know how many people we impact in the audience, but when I retired from NASA there were two female engineers that said I was the reason why they were there.”

The actresses in the film, who, like most other Americans, knew nothing of the characters they would portray, and just as little about the space program overall before they read the script, were transformed into promoters of space exploration as they learned that history, and met the people who made it. They have taken up the cause of bringing this proud history to as wide an audience as possible. All of them have participated in round-table discussions, press conferences, movie premiers, and other public activities to promote the film. Octavia Spencer bought out the tickets at a local cinema in Los Angeles over the Martin Luther King Day weekend in January, to enable single parents to bring their children to see the film. “If you know a family in need that would like to see our movie but can’t afford it, have them come... My mom would not have been able to afford to take me and my siblings. So, I’m honoring her and all single parents this weekend.”

NASA itself had previously recognized the contributions of the “West Computers.” Katherine Johnson, the principal “computer” in Margot Shetterly’s book, had received special NASA achievement awards in 1970, 1980, and 1985. Yet, in an interview on “Quora,” published by *Forbes* on Feb. 9, Robert Frost, NASA instructor and flight controller, was asked if current space agency employees were aware of the women portrayed in the *Hidden Figures* film. Frost stated that people who were “not aware, were not paying attention.” Referring to Johnson, Frost said, “Katherine got

a lot of attention nine years ago, when she was profiled on the main NASA website. I first learned about her about fifteen years ago when a manuscript called ‘Human Computers: The Women in Aeronautical Research,’ by a Beverly Golemba, was discussed at a staff meeting.”

Therefore, it is the film that has reached millions of people across the country and around the world. (*Hidden Figures* did surpass the *Star Wars* prequel at the box office on the first weekend of its release.) The movie is, however, transient. Margot Shetterly’s book is a more durable inspiration and contribution, which should be studied by all American youth twelve years old and up, as well as adults.

Our Historic Moment

What our nation needs is a full re-commitment to the vision of Kennedy, Glenn, Yuri Gagarin, Sergei Korolyov, and the hundreds of thousands of persons who carried out the greatest voyage in human history, to change our identity as a human species. China’s commitment to return to the Moon, to its currently completely unexplored far side; the possibility of mining helium-3 on the Moon as a source for thermonuclear fusion technology; the creation of interplanetary telescopes to peer more fully into deep space; the “space medicine” breakthroughs that promise the extension of human life; and the exploration of the other planets—this is the future that is truly intended for mankind. Why has the United States retreated from the vision of the future that inspired our greatest contribution to science?

The true “hidden figure” of our time is the creative mind of the human race, hidden from itself by the continued dominance of the infantile culture of war and the foolish acquisition of what is believed to be wealth—wealth which can be redefined and generated in a uniquely new form with every fundamental technologi-



Engineer, medical doctor and astronaut Mae Jemison, became the first African-American woman in space during her 1992 mission on the Space Shuttle Endeavour. Since leaving NASA she has actively encouraged young women to make their mark in history—in science, technology, and engineering.

cal breakthrough by the human mind. Wealth and resources are not pre-existent, but are created by the human mind. Hampton Institute’s, and other schools’ students of the 1940s and 1950s, knew that they were free in their minds, and therefore rich, not poor—no matter how “hidden” they might seem to be. It is space exploration that can provide the same experience of freedom to all of the American people, if it is now resumed as the “science driver” of a new era in human self-development.

The American poet and scientist Edgar Poe warned us that should we seek Eldorado, we must travel “over the mountains of the Moon.” Poe knew more than the economists and financial predators of today, who tell us that “space is too expensive.” The only thing that the exploration of space costs us, is that we have to give up our much-valued stupidity, whether about the non-existent idea of “race,” or of “territorial rights,” or of “human overpopulation.” If sixty million Chinese school children can watch Chinese scientists discuss weightlessness from space, why can’t the same number of American children be introduced to a new Chinese-Russian-American-Indian-international space project now, using the opportunity of a new Administration that has not said “No” to man’s future?