#1 Book Summary: Hidden Figures, by Margot Lee Shetterly

by Allen Cheng

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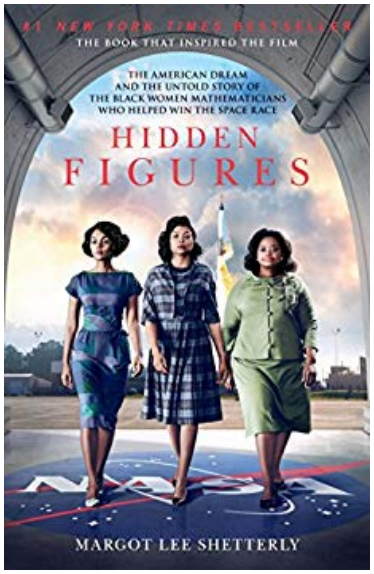

Hidden Figures tells the story of a group of African-American women who, over a period of over 25 years, made major contributions to the US space program. Working in the American South during the Civil Rights Era, they overcame both race- and gender-based discrimination to launch brilliant and storied careers as mathematicians and engineers. These women were the unsung protagonists who shaped America's destiny, playing a major role in the great drama of the nation's history.

1-Page Summary of Hidden Figures

_Hidden Figures: The Story of the African-American Women Who Helped Win the Space Race _tells the story of a group of African-American women who, over a period of over 25 years, made major contributions to the US space program during its golden age.** Overcoming racist and sexist discrimination, these women established themselves as brilliant mathematicians** **and engineers** and helped lead the United States to victory in some of the pivotal moments of the Cold War-era space race—including John Glenn's 1962 orbit of the Earth and the 1969 Apollo 11 moon landing.

The scene of their success was the Langley Memorial Aeronautical Laboratory in the Hampton Roads region of Virginia. It was here, in the heartland of American segregation, that a group of extraordinary women, including Dorothy Vaughan, Mary Jackson, and Katherine Johnson, helped their country break through the color barrier and leap into the great unknown.

World War Two

During World War Two, the gradual dismantling of the Jim Crow system of racial segregation began, as** the demands of the war economy brought African-Americans and women into jobs and industries from which they had previously been excluded**. This was especially true of the aeronautics and defense industry, which was crucial to the American war effort.

Facilities like Langley began to hire qualified women in large numbers to work as mathematicians and number-crunchers. Aeronautics was an intensely quantitative field: designing and testing combat planes produced a deluge of numerical data that needed to be processed and analyzed. **And that meant hiring an army of number-crunchers ("computers" as they were known at the time)**.

Under pressure from African-American civil rights leaders, the Roosevelt Administration took steps to desegregate the industry and open up defense jobs to _black _female applicants as well. This enabled the first generation of black female professionals to get in the door at Langley. The opportunity for a black person to work as a computer in an aeronautical laboratory (and not as a janitor or cafeteria worker) was something altogether new and extraordinary. In spring 1943, Dorothy Vaughan, a schoolteacher from Virginia, filled out her application. **In the fall, she received her answer: she was hired to work as a Grade P-1 Mathematician at Langley for the duration of the war.** It was a position that would last over 30 years.

Segregation

Despite the opportunity, new arrivals to Langley like Dorothy still had to face the prejudice of living and working in a segregated city of the American South at the height of the Jim Crow era. **Black people had to use separate bathrooms, separate drinking fountains, separate entrances on buses, send their children to separate schools, and live in separate neighborhoods**—or face severe repercussions. Indeed, segregation was powerfully entrenched in the nation's historical experience and was an all-encompassing feature of life in Virginia.

The prejudice even followed these women into the laboratory at Langley. **A separate area of the facility, known as West Area Computing, was reserved for the new black female computers**. Langley was generally a place where colleagues worked closely with one another. Because of the color of their skin, however, the West Area Computers were largely excluded from this collegial atmosphere. This was symbolized most hurtfully by the sign on the table where they sat at the back of the cafeteria that read, "COLORED COMPUTERS." In an act of defiance, the women of West Computing began tearing the sign down each day they saw it, a first shot across the bow for equality and dignity.

Facing this climate of discrimination, the first generation of West Computers established their own culturally vibrant and cohesive communities all throughout Hampton Roads. Such communities enabled

mobile young black families who'd moved to Virginia to keep their morale high and **served to welcome and acclimate new waves of black migrants to the region.**

Cold War

After the Allied victory in the war, Hampton Roads became a focal point of the US defense industry during the Cold War with the Soviet Union. This meant that most of the West Computers who had initially come to Langley on temporary assignment ended up receiving permanent offers of employment, as Dorothy did in 1946.

The Cold War also marked a turning point in the struggle for black civil rights, contributing to the eventual breakdown of Jim Crow. As the United States sought international allies in its fight against worldwide Soviet Communism, American policymakers began to realize that segregation at home had become a significant liability, one that made America's self-proclaimed leadership of "the free world" look hypocritical and handed a significant propaganda coup to the Soviet Union. The federal government began putting more resources toward desegregation and slowly started to side with the civil rights protesters over the die-hard segregationists.

Sexism

As women began advancing through the ranks at Langley in the postwar years, they saw that their sex was still a barrier to advancement in a field that was built and run by men. There was a whole universe of networking, consisting of lunches, cocktail hours, and men-only smoking sessions from which the women were excluded. Moreover, the decentralized nature of their work also disadvantaged the female computers. Because they were only given small portions of larger assignments to work on, it was difficult for the women to develop a holistic understanding of the kind of work the male engineers were doing.

The way to get noticed and start getting real credit for one's work as a computer was to get out of the general computing pool and become assigned to a specific group working on a particular project. This would allow for the development of specialized knowledge, which would make the computer far more valuable to the team than someone with just general knowledge.

The all-white East Computing unit was shuttered after the war—many of the white women had won new positions in specialized units, plus the changing nature of the work at Langley reduced the need for a general computing pool. All remaining general computing work was transferred to West Computing. This opened new doors to the black women who worked there. Black women started getting their names on published reports that were being produced by the laboratory. During this time, too, Dorothy Vaughan rapidly ascended the ranks at Langley: in 1949, she was appointed head of West Computing, a position she would hold for the next decade.

A New Generation

The postwar years would also see a new wave of black women coming to Langley, following in the footsteps of pioneers like Dorothy Vaughan who had done so much to open the doors of opportunity to

the next generation.

In 1951, a new 26-year-old native of Hampton Roads named Mary Jackson made her way to West Computing. From an early age, she had committed herself to helping young African-American women make the most of themselves—with a special focus on helping them prepare for college careers. But she, too, felt the sting of segregation—on one occasion at Langley, **she was mocked by a group of white female employees for asking where the "colored" bathroom was **(as white women, they found Mary's question absurd—why would they know where _her _bathroom was?). But she struck up a friendship with Kazimierz "Kaz" Czarnecki, a white engineer who was an assistant section head working on Langley's Supersonic Pressure Tunnel, who eventually assigned her to his group. Mary distinguished herself, earning a reputation as a trusted and capable mathematician. She was marked as someone who deserved to move ahead.

Another new arrival was Katherine Goble (later known to history as Katherine Johnson), a brilliant young mathematician from West Virginia. In 1952, she and her husband moved to Hampton Roads, drawn by the emerging job opportunities for black professionals and the opportunity for Katherine to work on exciting projects like the ones at Langley. Like those who had come to Hampton Roads during World War Two, Katherine found a ready-made community waiting to accept her and her family, helping her fill the void of the world she'd left behind in her native and beloved West Virginia.

Social and Technological Change

By the mid-1950s, the National Advisory Committee for Aeronautics (NACA), the agency that housed Langley, was beginning to introduce mechanical computers into its laboratory spaces. Companies like Bell Telephone Laboratories and IBM were supplying the government with the first generation of mechanical data-processing machines. The female mathematicians' jobs weren't immediately placed in jeopardy, but the most astute among them, like Katherine, could certainly see the writing on the wall—that mastering these powerful machines would be essential to future success at Langley.

This was also happening at a critical time for race relations in America. **The year 1954 saw the Supreme Court hand down the landmark *Brown v. Board of Education* decision**, which declared segregated public schools unconstitutional. The injustice of segregation had always been obvious to all of the West Computers. But now, at last, major cracks were beginning to appear in the segregationist system of the South.

Space Race

On October 5, 1957, the Soviet Union successfully launched the _Sputnik _satellite into orbit, inaugurating the space race and sparking a major panic among both American policymakers and the general public. All across the US, people with shortwave radios tuned in to hear the tiny satellite's telltale "beep beep" and organized observation parties to watch _Sputnik _as it travelled through space. **Sputnik also brought the absurdity of segregation to light**. If the Soviet satellite launch represented a true national crisis, then why were black Americans being denied the opportunity to fully serve their country? The US was leaving untapped the intellectual resources of a large part of its population, in service of a

ridiculous and morally indefensible commitment to racial apartheid.

All of this created great pressure on NACA to design and test satellites that would be capable of making it to space. The agency was selected as the home for all of America's space research and operations and given a new name: the National Aeronautics and Space Administration (NASA).

This brought major changes to the women of West Computing. There was less of a need for general computing skills and a greater demand for mathematicians with specialized knowledge. As such, West Computing was shuttered and its employees reassigned to smaller groups organized around specific tasks. Katherine also gained a more prominent role in the space program as she became attached to the Flight Research Division, working closely with an engineering group called the Pilotless Aircraft Research Division (PARD), which specialized in rocketry. Katherine was integral to the publication of technical reports that enabled the space program to put astronauts into orbit. **She overcame a great deal of institutional sexism, but she proved her value to the program with her obvious brilliance, competence, and passion for the mission.**

Into Orbit

The team of engineers with whom Katherine worked was tasked with mapping the exact trajectory of the manned spacecraft, from the second it lifted off the launchpad to the instant it splashed down in the Atlantic Ocean. Katherine had to process the numbers generated by the proposed trajectories, over and over, re-calculating the figures every time any slight detail in the flightpath was changed. There was zero room for error, as everything needed to be calibrated perfectly in order to launch the craft and return the astronaut safely. **Katherine was blunt with her bosses, telling them, "Tell me where you want the man to land, and I'll tell you where to send him up."**

Through the mission preparation, astronauts like John Glenn forged close relationships with human computers like Katherine Johnson. To them, these number-crunching women were the equivalent of test pilots, ensuring the soundness and reliability of their craft before they stepped into it. As Glenn always said, "Get the girl to check the numbers."

On February 20, at 9:47 Eastern Standard Time, the Friendship 7 rocket carrying John Glenn shot into orbit. After nearly four hours in flight, he returned to the bounds of Earth, with a near-perfect landing—calculated with precision by Katherine Johnson. When the navy scooped Glenn out of the waters while a jubilant nation looked on, few watching on television knew that a black female mathematician from West Virginia had mapped the journey of America's rendezvous with destiny.

Making History

Pioneering black female engineers and mathematicians like Dorothy Vaughan, Mary Jackson, and Katherine Johnson left an indelible mark on NASA, the struggle for African-American civil rights, and the United States itself.

When, on July 20, 1969, the men of the Apollo 11 mission finally walked on the surface of the Moon, it was the fulfillment of the hopes and dreams of a nation, as well as decades of research, advocacy, and

struggle on the part of NASA's black scientists and engineers.

The story of the women of West Computing is one of hope and triumph over the harshest adversity. It is also one of empowerment—these women exercised real agency and control over the course of their lives. They were protagonists who acted upon America and shaped its destiny, actors in the great drama of the nation's history.

Full Summary of Hidden Figures

Part One: New Opportunities

World War Two was the most devastating conflict in human history. Although the United States was spared from the ravages of combat on its own soil, the war nevertheless profoundly reshaped the country's economic, social, and political system. Perhaps the most lasting and significant domestic effect of World War Two was its role in** accelerating the dismantling of the Jim Crow system of racial segregation** that had prevailed throughout much of the American South for over a century following the end of the US Civil War.

**The demands of the war economy brought African-Americans and women int...

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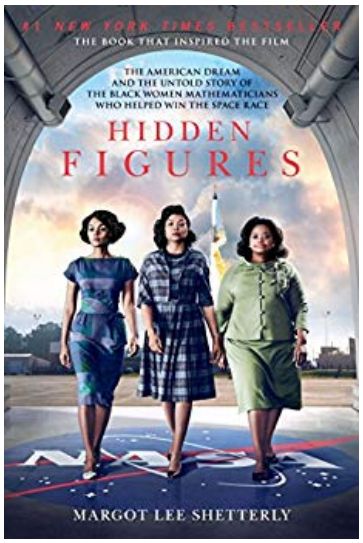

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- Exercise: Unpacking Prejudice
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