

Rudy Lee Horne: The Hidden Figure of *Hidden Figures*

1968–2017

Della Dumbaugh



Rudy Lee Horne, mathematics consultant for *Hidden Figures*.

Della Dumbaugh is a professor of mathematics at the University of Richmond and an associate editor of the Notices. Her email is ddumbaugh@richmond.edu.

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Introduction

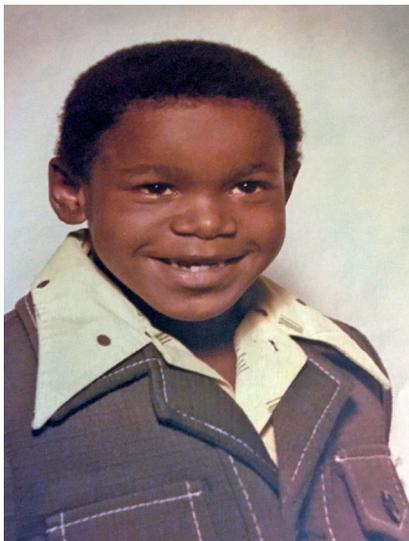
Rudy Lee Horne was a man with an easy, memorable laugh and a gigantic personality. He devoted his life to advancing applied mathematics and the next generation of mathematicians, especially mathematicians from underrepresented groups. He was also a mathematician with the rare distinction of a Hollywood movie credit. Horne's expert and affable work as the mathematics consultant on the Oscar-nominated film *Hidden Figures* helped make the possibilities and power of mathematics available to millions of people across the globe. *Hidden Figures* recounts the previously unknown story of African American women and their critical contributions to the space program at NASA.

Horne's work on *Hidden Figures* earned him the Reverend Jesse Jackson's Rainbow PUSH (People United to Serve Humanity) Coalition "Excellence in Stem Education" Award in July 2017 and the National Association of Mathematicians Lifetime Achievement Award, conferred posthumously in January 2018. He is one of a handful of mathematicians with a listing on the Internet Movie Database. His movie work did not outdistance the importance of his day job at Morehouse College, however. As Talitha Washington, an Associate Professor of Mathematics at Howard University and a program officer at the National Science Foundation described it, "Rudy Lee Horne was a direct role model for African-American male students because they could see themselves as hardcore applied mathematicians and have fun while doing it."¹

¹Maureen O'Donnell, "Rudy L. Horne dies at 49; Chicago native checked the math in 'Hidden Figures,'" *Chicago Sun Times*, January 21, 2018, <https://chicago.suntimes.com/news/rudy-l-horne-dies-at-49-chicago-native-checked-the-math-in-hidden-figures-2>.

Early Years

Rudy Lee Horne was born on October 18, 1968 in Englewood, Illinois, a Cook County neighborhood on the southwest side of Chicago. His father, Rudy Horne, Sr., worked at the Sherwin-Williams plant and his mother, Carolyn Horne, helped run a day care center. His entrepreneurial parents owned a 2-story duplex near 79th and Hermitage. The



Young Rudy Lee Horne.

Hornes lived on the top floor and rented out the first floor. Rudy was the oldest of three children. Rudy's younger brother William described their young life as "normal brothers doing normal things."² They enjoyed sports and playing outside with kids, albeit with very competitive spirits. If the first floor of their home was unoccupied, the children played and slept there. But Rudy took his older brother role seriously and watched out for William and their sister Frances. William described Rudy as a "brainiac... like a Doogie Howser."³ Rudy loved comic books as a boy, especially Marvel, DC (Batman, Superman, etc.), Star Wars, and Star Trek. He maintained this interest throughout his life. Rudy's family later moved to Country Club Hills and he graduated from Crete-Monee High School in 1986. It was in high school that Horne realized he liked calculus. Rudy's close-knit family included his Aunt Fran and Uncle Pete (Houston) who were both teachers. They emphasized school and college in particular. "Anything the aunts and uncles said, Rudy soaked it up," William observed. "For me, it was in one ear and out the other." With his interest in calculus and the encouragement of his family, he set off for the University of Oklahoma to pursue a college degree.

Undergraduate and Graduate School: University of Oklahoma and University of Colorado at Boulder

Horne attended the University of Oklahoma for his undergraduate studies and graduated in 1991 with a double major in Mathematics and Physics. In the summer after his sophomore year at Oklahoma, Rudy participated in the inaugural year of the SMART program at the University of Colorado in Boulder in 1989. Designed for undergraduates

interested in pursuing graduate degrees in STEM fields, SMART offered a 10-week undergraduate research experience for students from underserved populations from across the country. Rudy met physics professor Paul Beale through this summer experience. "By luck," Beale described it, "someone put his file in front of me." Beale went on to serve as his advisor that summer, introducing Rudy to non-linear wave equations.⁴ This introduction to the University of Colorado had lasting implications for Rudy.



University of Colorado Summer Bridge, 1995.

After graduating from Oklahoma, Rudy spent the next decade at the University of Colorado where he earned a master's in physics in 1994, a master's in applied mathematics in 1996, and a doctorate in applied mathematics in 2001. He was the first African-American to earn a PhD in applied mathematics at Colorado. Professor of applied mathematics Mark Ablowitz served as his dissertation advisor. Ablowitz pointed out that "Horne's very strong background in physics and classical mathematics made it natural for him to consider questions in applied mathematics, especially physical applied mathematics."⁵ "In those days," Ablowitz explained, "we were interested in long distance transmission of signals via fiber optics." By the late 1990s, one of the key questions



Close-up of Horne from the Summer Bridge group photo.

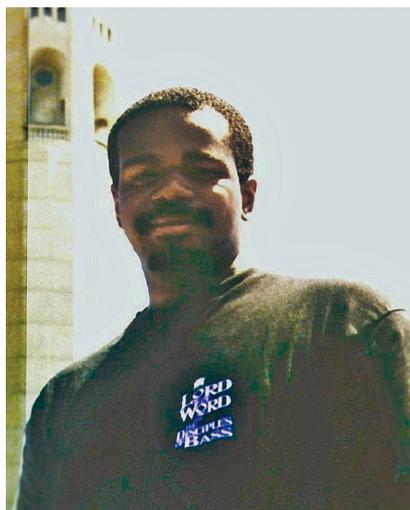
²Horne, William. Phone interview. 28 June, 2018.

³O'Donnell, "Rudy L. Horne."

⁴Beale, Paul. Phone interview. 29 June, 2018.

⁵Ablowitz, Mark. Phone interview. 10 July, 2018.

focused on how to send multiple signals in the same fiber and, in particular, how to address the instabilities caused by these multiple signals interacting with each other. Horne's task was to consider how these fibers interacted with dispersion management and without dispersion management. His work hinged on mathematical approximation techniques that could be implemented using nothing more than a laptop. Ablowitz noted that Horne was especially skillful at this more mathematical approach to an applied question. While Ablowitz oversaw Horne's thesis work, Beale continued his support of Horne in his role as the external examiner on his PhD dissertation committee. He



Horne at CAARMS 1995.

and Horne "became close and life-long friends during those years." While at Colorado, Rudy continued to work with the SMART program as a graduate student mentor. In this role, he provided SMART students with feedback on their projects and presentations, enjoyed meals with them in the dining hall, and coordinated weekend activities. In general, as Barbara Kraus, Program Manager of the Colorado Diversity Initiative described it, Rudy and other graduate student mentors helped the SMART students "adjust, academically and socially, to life on a top tier, predominantly white research campus."⁶ As a natural extension of the SMART design, a cohort of graduate student mentors often emerged as a support and mentoring network for the graduate students themselves. This type of network remained important to Horne throughout his career, most notably in his active participation in the Conference for African American Researchers in Mathematical Sciences, CAARMS. In addition to his work with SMART students, Rudy also taught in the 5-week intensive summer bridge program for rising first-year engineering students at Colorado. Drawing from the work of Uri Treisman, the Multicultural Engineering Program Summer Bridge hinged on dynamic study groups [Treisman]. Rudy's large, affable personality combined with his sheer joy for mathematics to make him a natural for this study group design. In this position, as David Aragon, Assistant Vice Chancellor in the Office of Diversity, Equity and Community Engagement at the University of Colorado put it, Rudy "served in a very

influential role helping scores (maybe hundreds) of underrepresented minority engineering students succeed in their gateway calculus and physics courses during his time as a graduate student."⁷ Rudy's work with the Colorado SMART and Bridge programs ultimately served as a beginning for what would become a lifelong commitment to advancing underrepresented students in mathematics. His decade at Colorado gave him the opportunity to do good work and make a difference in people's lives, as well as earn a degree that would provide him with the credentials to do that throughout his career.

Postdoc: University of North Carolina at Chapel Hill

After a year at the California State University, Hayward (now known as California State University, East Bay), Horne secured a postdoctoral position with Professor Chris Jones, the Bill Guthridge Distinguished Professor at the University of North Carolina, from 2002 to 2005. At the time, Jones' research focused on non-linear optics. Jones welcomed Horne's expertise in four-wave mixing and his collegial ability to bring this new approach to the group. He especially welcomed Horne's enthusiasm. "He was the kind of guy who lifted your spirit, he was enthusiastic, he had a love of life. He kept us all buoyant."⁸

Written in the form of a personal letter, Jones captured the richness of Horne's contributions to his lab in his personal tribute to him for SIAM. "As a postdoc with me," Jones wrote, "you brought all your ideas about wave interactions into the group. This led to thinking about random effects and their influence on such interactions. You showed us how to think about this and guided us to a deeper understanding. Looking back, this is not something I would have foreseen working on, let alone figuring out, but without you we would not have done. This happened again just a few years ago when you showed me the world of PT-symmetry and the work you had done. We were just beginning to see the possibilities in this area."⁹

Jones' comments hint at one of Horne's greatest strengths: his collaborative nature. Horne found success by doing and sharing mathematics. Horne "would pull his own weight mathematically" and advance the group and himself in the process. Along the way, Horne benefited from other experienced colleagues in the mathematical community supporting, encouraging, and advising him. Horne and Jones continued their work together after he left UNC and Horne, Jones, and Jones' family remained steadfast friends throughout Rudy's life. In July 2018, Jones

⁷Aragon, David to Della Dumbaugh, July 5, 2018.

⁸Jones, Chris. Phone Interview. 14 July, 2018.

⁹Chris Jones, "In Memoriam: Rudy L. Horne," The Dynamical Systems Web, <https://dsweb.siam.org/The-Magazine/Article/in-memoriam-rudy-l-horne>.

⁶Kraus, Barbara to Della Dumbaugh, July 6, 2018.

gave the inaugural Rudy Lee Horne Applied Mathematics Lecture at CAARMS.

Jones also hinted at the reality of Horne's experiences as an African American mathematician when he said, "I cannot fully understand the obstacles you had to overcome to get where you did. The times you were not supported, the rejections you had to face and all the doubts you must have had whether you could make it. But you persisted," Jones celebrated, "and make it you did." Jones extended this assessment when he commented that Horne was like the 1970s Weeble toy, "the proverbial thing that bounces back, no matter how many times you try to knock it down." Years later, Horne might have recognized this exact same spirit in his student, Zerotti Woods, when he met him at Morehouse (see below).

After his postdoc at UNC, Horne served on the faculty at Florida State University before he accepted a tenure track position at Morehouse College, a historically black college and university (HBCU), in 2010.

Morehouse College: "You can, you will, you should."

At Morehouse, Horne seemed to have found his life's work—in more ways than one. He achieved the traditional standards in academia, earning tenure and promotion to Associate Professor in 2016. His colleague, Ulrica Wilson, captured the essence of his contributions to Morehouse. She described Horne as "active and engaged with students. He was a young black man that was a role model for African American students pursuing math—whether those students were non-majors getting through their required coursework or majors pursuing careers in math."¹⁰ Wilson underscored the challenges facing young black men as they live in the world today. "When people see a black man, people often see all kinds of images—images informed by their perception," Wilson explained. "Black men are trying to excel and live their lives in a world that does not always see their promise. Sometimes, in that body, it's hard to live and pursue an identity that does not fit others' expectation. Who we are at the park, who we are at the grocery store—for some people this is not stifling, for us and for black men, in particular, it can be." When young black men come to Morehouse they are surrounded, often for the first time, by other black men students and role models that allow them to focus on and develop new possibilities for their lives.

As current Morehouse College student Kevin Womack expressed it, Rudy Lee Horne "had a billion degrees in some intense subjects. He understood the importance of math and how it can be applied to do some powerful things." Dr. Horne encouraged Womack to major in math and computer science. Womack just finished his third summer

as a Google intern thanks, in part, to this combination of majors.¹¹

Womack took Calculus III and Ordinary Differential Equations with Dr. Horne. He described each day in Calc III as something "like an episode of a TV show. Dr. Horne would spin a story. We would ask him questions. Our questions told him what we could do. And then he'd say, 'wait until you see what we are doing tomorrow.' We were excited to be in the class, he was excited to have us. Everyone in the room was a black male in an advanced math



Zerotti Woods, Jasekani Furbert-Wade, Mohlomi Taoana, Horne, Ryan Hynd, Umaru Waizoba, Jordan Clark, Duane Cooper.

class. I can't think of that happening anywhere else other than an HBCU."

Morehouse College student Zerotti Woods met Horne soon after he joined the faculty. Woods took Complex Variables and Numerical Analysis with him. "It was always funny how much of a nerd he was in class," Woods recalled, "he loved what he did and it showed. He had enthusiasm. It never seemed like he was working." He described Horne as a "really big mentor" for him. In particular, Horne showed him "the importance of teaching, of grooming the next generation of mathematicians who look like us. He never made it seem like it was weird to want to be a mathematician."¹²

Before Woods graduated from Morehouse in 2014 and left to pursue a PhD at the University of Georgia, Horne "made it clear" that he would struggle with things in graduate school, that he would not be accepted straight away. Woods attributes his success at Georgia to what he learned at Morehouse, especially the confidence the faculty instilled in him, and to his upbringing in inner city Atlanta. "Every time someone tries to build a narrative that they made it in

¹⁰Wilson, Ulrica. Phone Interview. 15 June, 2018.

¹¹Womack, Kevin. Phone Interview. 26 June, 2018.

¹²Woods, Zerotti. Phone Interview. 28 June, 2018.

spite of coming from the inner city of Atlanta, I point out that I made it *because* of coming from inner city Atlanta. I've never seen anything work the first time for any of the people I love. I've always seen an iterative process. They were okay with it, so I was too." He did not mind failing and getting back up, staying up until the wee hours of the night if that's what it took to do the work. Woods' success testifies to the power of Morehouse and other HBCUs in preparing students for graduate work. From 2010 to 2014 (the latest national data available), 38.1% of black doctorate recipients in mathematics held baccalaureate degrees from HBCUs.¹³

"One of the things I miss about Morehouse," Woods observed, "is that I could identify as a mathematician. There wasn't anything else I had to identify with first. Now, at Georgia, I have to identify first as a black man." The movie *Hidden Figures* helped him understand the importance of his Morehouse experiences even more. When he saw the buildings from Morehouse in the film, "I wanted to stand up in the theater and shout, 'hey, that is my school.'" He was surprised and delighted to recognize Dr. Horne's handwriting on the board (in the form of the young Katherine Goble Johnson's factorization of a quadratic). But he was not surprised at all about Euler's method appearing in the movie. Woods fondly recalled that Horne "loved Euler's method and the bisection method. He droned on and on about them in numerical analysis."

Dr. Horne worked with *Hidden Figures* in the summer of 2016, just between Kevin Womack's classes in Calculus III and ODE. Womack described the excitement of the Morehouse students when they learned over the summer that Dr. Horne was working with Taraji Henson. Horne emerged as something of a celebrity on the campus. "He played it so cool. He made it seem so casual," Womack remembered. "I can't imagine explaining equations to Taraji Henson," he reflected. Horne's job included ensuring the actors and actresses represented the mathematics accurately. Taraji Henson, for example, learned mathematics like she would learn lines.¹⁴ Womack had to laugh when he learned Taraji Henson felt challenged by learning some of the mathematics. "I would expect it would be hard for Taraji. I don't remember any of Dr. Horne's classes being easy. She got a fair Dr. Horne experience."

Wilson similarly recalled that Horne did not "gloat" about the movie work but when he talked about it, "he would just shine." Even after his work with the movie was

over, the movie came out in theaters and "2017 was the best year of his life."

Overall, Horne supported Womack and other students at Morehouse. "He tried everything he could to make Morehouse a safe place," Womack reflected, "his message was not about the people who would block us or serve as obstacles. He wanted to be our champion. His message was: You can, you will, you should." Morehouse College provided the perfect home for Horne to continue to make a difference in the lives of the next generation of mathematicians. It also provided the unexpected opportunity for Horne to work with the *Hidden Figures* movie cast and crew and subsequently influence millions of people who would never set foot in his mathematics classroom.

Hidden Figures Work

In March of 2014, a 55-page nonfiction proposal about black women mathematicians at NASA in Hampton, Virginia found its way to the desk of Donna Gigliotti, producer of *Shakespeare in Love* and *The Reader*. "I kind of couldn't get over the fact that this was a true story and I didn't know anything about it," Gigliotti confessed. "I thought well, this is a movie." Those 55-pages grew into the 368-page book we now know as *Hidden Figures: The American Dream and the Untold Story of the Black Women Mathematicians Who Helped Win the Space Race* and the associated movie that debuted on Christmas Day, 2016 with Taraji P. Henson, Octavia Spencer, and Janelle Monae with the simpler title of *Hidden Figures*.¹⁵ In part, the idea appealed to Gigliotti's natural affinity for strong female characters. She partnered with director Theodore Melfi who won Gigliotti over when he took himself out of consideration for the next Spider Man film so he could make what we have come to know as *Hidden Figures*.

Gigliotti and Melfi made a point to capture the realities of a segregated workplace and to portray realistic home lives of middle-class African Americans in the 1960s. They were also committed to the accuracy of on-screen calculations. For this part of their work, they relied on Horne "to tutor the cast and crew on set." Initially, Horne turned down the offer to work as the mathematical consultant on the film fearing that it would take too much time away from his teaching and research. His colleagues encouraged him to accept the position, however, and he changed his mind. He would never regret it.

Over the 43 days of filming in Atlanta, Horne visited the set about a dozen times to work with the cast and crew. As Horne described it, "[a]ny math that she [Taraji P. Henson]

¹³"Baccalaureate origins of black doctorate recipients," accessed July, 2018, <https://www.nsf.gov/statistics/2017/nsf17310/digest/enrollment/hbcus.cfm>.

¹⁴Joe Ebentraut, "This 'Hidden Figures' Mathematician Inspired Generations of Black Students," *dose*, <https://dose.com/articles/this-hidden-figures-mathematician-inspired-generations-of-black-students>.

¹⁵Justine Neubarth, "Do the Math-An Amazing True Story Plus A Dedicated Team Adds Up to 'Hidden Figures,'" Producers Guild of America, December 13, 2016, <https://www.producersguild.org/blogpost/1537650/264534/DO-THE-MATH--An-Amazing-True-Story-Plus-A-Dedicated-Team-Adds-Up-To-Hidden-Figures>.

wrote on the board, I was responsible for training her to write said math on the board. My other task was primarily to check that the mathematics on the blackboards in the background scenes and in note books was consistent with the things that NASA did at the time." These "background scenes" included Horne's own handwriting. In one of the early scenes of the movie, a young Katherine Johnson [Lidya Jewett] factors a quadratic on a chalkboard. Horne actually did this calculation on the board.

When working with Henson, Horne encouraged her to think of the mathematics she had to write and speak in the movie as lines in a script. The stakes were high for Henson. The mathematical aspect of Johnson's life made it difficult for Henson to play her character. She admitted that "[t]hinking about doing the calculations on the board, I broke out in hives last night." Her fear arose because she wanted "to do right by Ms. Katherine Johnson, who's still alive, and her family, and I want to do right by her legacy."¹⁶ Horne was so successful at his work that Gigliotti later suggested that Henson "should be nominated for an Academy Award just because what she is doing on the chalkboard. Everything that she is doing, she is doing accurately."

Horne also influenced the script of the movie. He offered Melfi the suggestion of Euler's method as a way to solve a problem related to the calculation of the trajectory to bring John Glenn back to earth. Melfi "really liked that concept," Horne later commented. "I didn't expect him to, but he actually put that into the script."¹⁷ None of Horne's numerical analysis students were surprised by Horne's suggestion.

Professor William Massey, the Edwin S. Wilsey Professor of Operations Research and Financial Engineering at Princeton University, noted lightheartedly that the mathematics community owes Horne a great deal for his efforts to ensure that Henson pronounced Euler as "Oiler" in the movie rather than "Youler."¹⁸

As with his more traditional students, Horne's affable personality and sheer love of mathematics endeared him to the actresses he worked with closely. After his death, Henson acknowledged "the passing of Rudy Lee Horne, who was part of our team that brought the story of Katherine Johnson and the 'Hidden Figures' in the space program to the screen and let the world know of their accomplishments." She said *Hidden Figures* was "a blessing to all of us and shed light on a story hidden for far too long."¹⁹ After Horne's death Jewett tweeted "I just got an A- on my first Algebra 1 test. You told me from the math room on set I could

¹⁶Sarah Lewin, "On 'Hidden Figures' Set, NASA's Early Years Take Center Stage," Space.com, September 2, 2016, <https://www.space.com/33886-hidden-figures-movie-set-visit.html>.

¹⁷Jacob McClelland, "OU Graduate Makes Sure 'Hidden Figures' Math Adds Up," February 15, 2017, kgou.org/post/ou-graduate-makes-sure-hidden-figures-math-adds.

¹⁸Massey, William. Phone Interview. 27 July, 2018.

¹⁹O'Donnell, "Rudy L. Horne."



Horne delivering the Blackwell–Wilkins Keynote Address at CAARMS 2017.



Horne at CAARMS 2017.

do it. And now I really do it! RIP Mr. Rudy." Jewett's tweet calls attention to the "math room" on the set of an Oscar nominated film. That combination seems like an oxymoron. If there was anyone who could bridge the worlds of Hollywood and mathematics, it was Rudy Lee Horne. "It made sense that they asked [Horne] to do it," his former PhD advisor Mark Ablowitz explained, "he was good at

doing math, good at learning math, and good at teaching math. He was a high-quality mathematician, high-quality person, and a high-quality teacher. He did it all."

Impact of Horne's contributions to *Hidden Figures*

After his work on the film, Horne was quoted in more than two dozen stories about *Hidden Figures*. He was a guest on National Public Radio's *Closer Look* and was interviewed in *insidescience.org* and *science.com*. He received invitations to give talks at various venues, including the 23rd annual CAARMS at the University of Michigan in July 2017. At CAARMS, Horne delivered the Blackwell-Wilkins Keynote Address with a talk on "Hidden Figures: Bringing Math, Physics, History & Race to Hollywood."

William Massey had invited Horne to deliver this address. "If I had hesitated [to invite him to speak]," Massey recently reflected, "I would have regretted that the rest of my life." Massey had originally met Horne at the first CAARMS conference in 1995, now called CAARMS1. At the time, Massey was a Member of the Technical Staff at the Mathematical Sciences Research Center at Bell Laboratories. Massey had observed his African American science colleagues at Bell Labs participate in annual meetings with their fellow Chemists or Physicists, for example. He wondered why African American research mathematicians did not have a dedicated annual meeting. Consequently, Massey helped organize CAARMS1 and every conference since that time. With Horne's talk on *Hidden Figures*, he became the first CAARMS participant to begin as a student member of the group and later give an invited address. Horne's involvement with CAARMS had, literally, spanned his entire career. He attended the first CAARMS at MSRI as a graduate student and remained active and involved at every stage of his career.²⁰

Massey noted two important lessons from the movie for the broader public, both focusing on change. "For white America," as Massey described it, "the message is that you have to learn to accept other people as equal. For black people, the message is that you have to learn how to program in Fortran. Dorothy Vaughan was not standing around waiting to be someone's victim. She does not conveniently fit into the noble victim narrative. She did something about it." For Horne, Massey noted that "he lived long enough to see, to feel something was coming back to him, that more people became aware of what he did. Any researcher would give

anything to have 1/100 of the number of people that saw the movie to know about their work."

Perhaps the greatest satisfaction for Horne came from the students the movie inspired. "I had a student here at Morehouse who came up to me and mentioned that after he had seen the film it really inspired him to want to do mathematics," Horne said. "If the film does that, if it helps get more women in science, it gets more African Americans, or for that matter more people—whether an African American, white, Hispanic, whatever. If it gets more people involved in math and science and STEM fields, that's a great thing."²¹

Taraji Henson expressed a similar viewpoint, only from the Red Carpet at the Screen Actors Guild (SAG) Awards on January 29, 2017, a place where few mathematicians or proponents of mathematics are represented. "The movie is important, and I don't want another young girl thinking that math and science is not for her," Henson said.²²

Horne also hoped to use his *Hidden Figures* opportunity to convey the excitement of learning mathematics. "When you've banged your head against the wall of a problem for hours or days or weeks or months," Horne said, "then you finally get a notion of or know how to solve said problem. Sometimes, you wander around for a while, lost, and then you figure out what you need to do. That sense of accomplishment is sometimes hard to describe to people who aren't doing that."²³



Left to right: Professor Rudy Lee Horne, Professor Monica Jackson (American University), Dr. Gelonia Dent (Brown University / Medgar Evers College), Dr. Idris Stovall (Mathematical Sciences Institute), and Professor William A. Massey (Princeton University).

²⁰For more on CAARMS, see the website at www.caarms.net and W. A. Massey, "Mathematics is Four Dimensional," *Council for African American Researchers in the Mathematical Sciences: Volume III*. Contemporary Mathematics, editors Alfred Noel, Earl Barnes and Sonya A. F. Stephens. Volume 275, 2001, pp. 147–158. For more on the creation of CAARMS, see Raymond Johnson, "Conference for African American Researchers in the Mathematical Sciences at MSRI," *Notices of the American Mathematical Society*, December 1995, pp. 1496–1500.

²¹McClelland, "OU Graduate."

²²Marissa G. Muller, "The Hidden Figures Effect is Real: How It's Inspiring Young Women to Seek Careers in Science and Technology," *Glamour*, January 30, 2017, <https://www.glamour.com/story/hidden-figures-inspiring-young-women-science-and-technology>.

²³Lewin, "On 'Hidden Figures' Set."

Epilogue

At the end of the fall 2017 semester, Horne had to miss a few days of classes for a health issue related to his heart. "He came back one day and told us everything was okay now," his student Kevin Womack remembered. "But that was the last time I saw him." Horne died at the age of 49 on December 12, 2017, less than one year after the debut of *Hidden Figures*.

It's impossible to write a Memorial Tribute to Rudy Lee Horne as either the *individual* mathematician or the man. Horne didn't exist as a single person; he lived life as part of a wide community. He was at his best when surrounded by family, colleagues, students, and friends. His very presence made the people around him better. As Professor Chris Jones described it, Horne's "impact on our lives will persist...[he] changed us all for the better and that will be inherited by people who never even met [him]."

Horne's career underscores the power of a mathematical community that stretches over a lifetime and across institutions and organizations. His success points to the importance of programs like SMART, of organizations that dedicate resources to encouraging underrepresented groups and, above all, of colleagues that intentionally support and guide future generations of mathematicians. His life affirms the practical and lasting outcomes of these types of institutional and personal initiatives that transform a life through mathematics. Horne's student, Kevin Womack, for example, is currently applying to PhD programs in computational and applied mathematics, a certain indication of his former professor's lasting impression on him.

Aside from his meaningful impact on the people around him, Horne's legacy will live on through the CAARMS annual Rudy Lee Horne Applied Mathematics Lecture, the Dr. Rudy L. Horne Scholarship at Morehouse College, and the Rudy Lee Horne Memorial Scholarship at the University of Colorado Boulder.

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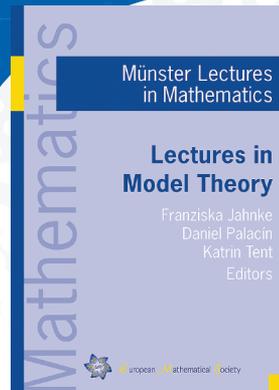


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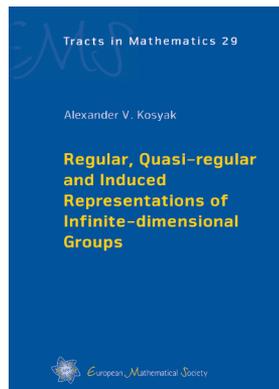
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