(As published in The Oak Ridger's Historically Speaking column the week of August 17, 2020)

Carolyn Krause first became interested in learning more about J. Ernest Wilkins, Jr., an African American researcher with the Manhattan Project, when she saw a small exhibit on him last year at the new American Museum of Science and Energy in Oak Ridge. Here's what she found out.

A child prodigy, Jesse Ernest Wilkins, Jr. (1932-2011) entered the University of Chicago at age 13, the youngest student ever admitted there. He received his Ph.D. in mathematics at the university at age 19.

In 1944, while collaborating with distinguished scientists at the university's Metallurgical Laboratory on ways to produce plutonium-239 for a future atomic bomb, Wilkins, then 21, led a team about to be transferred to Oak Ridge. Its mission: to work on plutonium production and separation projects associated with the X-10 pilot reactor (the future Graphite Reactor of Oak Ridge National Laboratory). The team was part of Eugene Wigner's theoretical physics group.

But Wilkins did not follow his team to Oak Ridge in the fall of 1944. The reason: he was black.

It didn't matter that the Chicago newspapers had hailed Wilkins as a "negro genius." It didn't matter that the brilliant Eugene Wigner, a future Nobel Laureate, had told Edward Teller, the future father of the hydrogen bomb, that Ernest Wilkins had been doing "excellent work."

The problem was that Oak Ridge, like the rest of the South, abided by the "Jim Crow laws"— enforced racial segregation. These laws, which arose from a post–Civil War and post-Reconstruction ideology that promoted white supremacy and black subjugation as a way of life in the South, likely would have prevented Wilkins from assuming a scientific post here.

If Wilkins had moved to Oak Ridge, he would not have been allowed to eat and chat with the white men he was supervising in the whites-only cafeterias and recreation hall. If he rode the bus anywhere in Oak Ridge, he would have been forced to ride in the back. He would have found it practically impossible to vote in the presidential election even though the 15th amendment of the U.S. Constitution, ratified in 1870, gave him that right.

He probably would have rented a room or house in Knoxville rather than accept an assignment to one of the thousands of hutments in Oak Ridge. Mostly unskilled black workers lived in these 16-foot-square, uninsulated plywood units that had one door and a potbelly stove but no electricity, no plumbing, no furniture and no glass in the windows.

Wilkins likely would have been shocked to learn that the married blacks residing in the hutments were not allowed to live together and had to leave their children behind. He would have been dismayed that hutment compounds were surrounded by a five-foot fence topped with barbed wire to keep the men and women separated.

Teller knew that officials of the Army in charge of the Manhattan Project work in Oak Ridge were "not out to promote social change," as Jay Searcy, author of "The Last Reunion," put it. "Its mission was solely to complete a project as rapidly and with as little resistance as possible."

That's why Teller made this recommendation in a letter he sent on Sept. 18, 1944, to Harold Urey, then director of war research at Columbia University: *"Knowing that men of high qualifications are scarce these days, I thought that it might be useful that I suggest a capable person for this job. Mr. Wilkins in Wigner's group at the Metallurgical Laboratory has been doing, according to Wigner, excellent work. He is a*

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colored man and since Wigner's group is moving to "X" it is not possible for him to continue work with that group. I think that it might be a good idea to secure his services for our work."

Remaining at the Met Lab, Wilkins collaborated with Wigner on research in neutron absorption, leading to their discovery of the Wigner-Wilkins approach for estimating the distribution of neutron energies within nuclear reactors. Their joint paper, written in 1944 and declassified in 1948, was eventually published in Wigner's "Collected Works." Wilkins was not told of the Met Labs' ultimate goal until after the atomic bomb was dropped on Hiroshima, Japan, on Aug. 6, 1945.

After World War II, Wigner became the first research director of what is now ORNL in 1946-47. In 1946, Wilkins was hired as a mathematician by the American Optical Company in Buffalo, N.Y., where he contributed to the development of higher-resolution lenses for microscopes and large telescopes. By then, he was becoming known for his discoveries with respect to thermal neutrons – the Wilkins effect, the Wigner-Wilkins spectra and the Wilkins spectra.

In 1947, he got married and he and his wife had two children. That same year he was invited to attend the American Mathematical Society (AMS) meeting at the University of Georgia. Committee leaders informed him they had found a black family with whom he could stay and eat because he was not permitted to join the white attendees in the segregated hotel. Offended by their racism, Wilkins never attended an AMS meeting in the Southeast.

Wilkins may be best known for his research on the penetration of gamma-rays, conducted in collaboration with Herbert Goldstein and published in 1953 in the prestigious scientific journal Physical Review. Wilkins developed mathematical models for calculating the amount of gamma radiation a given material can absorb. His work was crucial to the development of shielding to protect humans and equipment from harmful gamma radiation emitted by nuclear sources and the sun, key contributions to the design of safe nuclear reactors and space probes.

Wilkins had a long and distinguished career in nuclear physics and engineering. He helped design and develop nuclear reactors for electrical power generation. He eventually became part owner of one such company. He served as president of the American Nuclear Society in 1974-75.

In 1976, he was the second African-American to be inducted into the National Academy of Engineering, which cited him for contributions to the development of nuclear reactors for peaceful atomic energy applications. (He also had skills in mechanical engineering, having obtained two degrees in the field from New York University.)

Between earning his Ph.D. and taking a job at the Met Lab in the 1940s, Wilkins was a postdoctoral researcher at the Institute for Advanced Study at Princeton University and then an instructor in mathematics at the Tuskegee Institute, one of America's historically black colleges and universities (HBCUs).

Despite his outstanding credentials and his publication of some 100 research papers in pure and applied mathematics, optics and nuclear engineering, no research university would employ him, apparently because of his race. So, his seven-decade career included jobs with industry and government and his appointments as a distinguished professor of math and physics at two other HBCU schools – Howard and Clark Atlanta universities. He was thesis or dissertation advisor for 22 minority graduate students. And he founded Howard University's Ph.D. program in mathematics.

He also served as a scientific manager. From 1977 to 1984, Wilkins worked at EG&G Idaho, becoming vice president and deputy general manager for science and engineering. Before he retired in 1985, he was named a fellow at the Department of Energy's Argonne National Laboratory, a pioneer of nuclear

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reactor research along with ORNL. [Earlier, Wilkins had written 22 unpublished reports for the Atomic Energy Commission (DOE's predecessor) on the design, operation and heat transfer of nuclear reactors.] In 1990 he entered a relationship of mutual respect with Oak Ridge when he was named to the council of Oak Ridge Associated Universities. In March 2007, the University of Chicago's Department of Mathematics honored Wilkins in a special ceremony that included the dedication of his portrait and a plaque.

According to his obituary, Wilkins was "a quiet, kind, gracious, sophisticated and complex person who mentored many students and colleagues and was 'worshipped' by several generations of friends and young students seeking careers in mathematics, engineering and the physical sciences."

Did he have any other talents and claims to fame? Yes. While at the University of Chicago, Wilkins was the university table tennis champion for three years!

Ernest Wilkins' family

J. Ernest Wilkins Jr., who made significant and fundamental contributions to nuclear physics and engineering, optics and pure and applied mathematics, came from a highly accomplished African-American family. In 1954, his father, J. Ernest Wilkins, then a lawyer, was appointed U.S. assistant secretary of labor by President Dwight D. Eisenhower. He was the first black man to ever attend a White House cabinet meeting and, in 1957, he became the first black member of the first U.S. Civil Rights Commission.

Both of the brothers of Wilkins, Jr., were Harvard Law School graduates; one worked as an attorney and the other had a position with the Justice Department in Washington, D.C. A grandfather was pastor of the largest Methodist church in Harlem.

Wilkins' mother was one of the few black women to earn a master's degree from the University of Chicago at the time. And Wilkins' niece, Carolyn Marie Wilkins, a professor at the Berklee College of Music in Boston and a pianist, singer and composer, published a 2010 memoir "Damn Near White: An African American Family's Rise from Slavery to Bittersweet Success." It has a chapter on J. Ernest Wilkins, Jr.



J. Ernest Wilkins, Jr., 3

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Wilkins led a team in Chicago that moved to Oak Ridge to continue its plutonium research for the Manhattan Project. Wilkins was prevented from joining the team because of racial segregation in the South.