

PORTRAITS Podcast – *The Woman Who Knocked Science Sideways, With Jada Yuan* (Season 4, Episode 2)

[INTRO MUSIC]

Jada Yuan: Basically, all my life people would come up to me before I even knew what my grandmother did and say your grandmother should have won the Nobel prize. And I just like, I didn't understand and it's just like a weird thing to hear when you're a kid.

Kim Sajet: Welcome to Portraits, I am Kim Sajet, Director of the National Portrait Gallery. It can be really tricky to reconstruct a portrait of a loved one once they've passed. Especially grandparents, since we don't always have the luxury of knowing them as adults. But what if you're retracing the life of your grandmother and she happens to be world famous. She has a picture on her wall where she poses with someone you later come to realize is the Pope. There's another with President Gerald Ford. And another with Muhammad Ali. You learn she's a Rockstar in China and you're invited to an Opera that tells her life story. This episode, we look at one woman's quest to paint a fuller picture of her famous ancestor.

Jada Yuan: So, I'm Jada Yuan. I am a political feature writer at the Washington Post. I was a long time New York Magazine writer, and I was the 52 places to travel writer for the New York Times.

Kim Sajet: Jada applied her reporting skills to her grandmother, Dr. Chien-Shiung Wu. She was a nuclear physicist who knocked the scientific world sideways with her parody experiment. Dr. Wu also worked on the Manhattan Project. She was even a Jeopardy question.

[MUSIC]

Jeopardy Host (Separate Audio Clip): Honored on a 2021 stamp, Chien-Shiung Wu was best known for her work on this secret program to build the first atomic bomb. [Pause] Matt.

Jeopardy Participant (Separate Audio Clip): What is Manhattan Project?

Jeopardy Host (Separate Audio Clip): Yes!

Kim Sajet: Jada wanted to reconcile this towering figure with the petite gray-haired woman she actually remembered. To Jada, Dr. Wu was not so much a world-renowned scientist, as the woman who welcomed her into her upper west side apartment in New York and wouldn't stop feeding her.

Jada Yuan: It was just this other world. It smelled of Chinese food, like cabbage. There were Jade carvings. Yeah, I just I just remember sort of feeling Chinese in there. It's where my grandmother taught me how to use chopsticks.

Kim Sajet: I started by asking Jada to have a look at a photograph of her grandmother that came into the National Portrait Gallery's collection in 2016. So maybe I could start Jada, if you could just describe for us, but what's happening in this picture for those who may not have it in front of them? And even more to the point, what is she doing? Could you describe, you know, what were the groundbreaking parts of her physics that has led her to this elevated status in global knowledge?

Jada Yuan: Okay, I'm sorry to say it beats me what exactly she's doing. She's working on a-

[Laughter]

Jada Yuan: She's working on a piece of physics equipment. And this portrait was taken in 1978. I'm not sure what month but I was born in April of that year. So, I certainly did not know her. Although she did give me my middle name at that time. It's Shin Chi, which means outstanding scholar.

Kim Sajet: Oh, I love that.

Jada Yuan: I mean, what I'm assuming is she was a Pupin Professor at Columbia. She had this sort of vaunted chair starting when she started working on the Manhattan Project there. And so, I assume that she's in her laboratory here. I really love her boots. She had great style. So, she's wearing boots and some very cool looks like gray wool trousers and a lab coat, as well as a dress underneath. She always had these high collared Chinese blouses or dresses, Qi Pao. And it was very, I hate to use the word exotic, but it was in those times. She was a female Chinese physicist in a world that you know, in a field that still is really dominated by white men. And so, she would wear these beautiful brocade dresses under her lab coats that made her stand out a lot.

Kim Sajet: And she's looking very intently at a piece of equipment that looks like it's sort of hooked up to some kind of gas cylinder or something, but it is in a lab of sorts, but it's got computer equipment everywhere and cords and buttons and she's staring very intently. It looks like she's almost putting two kinds of electrical cords together or something. She's manipulating something on this piece of machinery.

Jada Yuan: So yeah, so what I noticed is she's sitting on some sort of canister, it looks like-

Kim Sajet: Oh yeah, I see that now, actually, you've got really good eyes. I didn't even notice that.

Jada Yuan: Yeah, there was a very sort of DIY aspect to experimental physics. So, my grandmother was an experimental physicist, versus a theoretical physicist. And the theorists were often the ones who got Nobel Prizes. And I think that there is this sort of sense that experimental physics is, you know, very, very scrappy

[Laughter]

Jada Yuan: Very scrappy thing. And so, the fact that she's sitting on a canister, and she's playing with the wires herself is, is very true to what experimental physics was, you know, her students would sleep

on the floor of her lab trying to get a result or make sure that things didn't go right. And she was part of a very exciting moment in physics. I like to think of it sort of, like the rock scene in New York City in the 1960s. Sort of like in the East Village. It was just like where you wanted to be, everything was happening, it was news, it was thrilling. And my grandmother worked on an experiment in 1956 to 1957 that proved a theory about the non-conservation of parity, which is basically she proved that the universe is not mirror symmetric, that the universe does distinguish between left and right, which was not considered to be true in for about 30 years in physics.

[MUSIC]

Kim Sajet: If the non-conservation of parity during beta decay is not your strong point, maybe this will put things into perspective. When astrophysicist told Jada that her grandmother's discovery, quote, "may be at the root of why there is something instead of nothing, why everything didn't annihilate into oblivion, and ultimately, why the universe as we know it exists at all".

Jada Yuan: And the theorists that she worked with, TD Lee and Chen Yang, both Chinese nationals, as well as her won the Nobel Prize, but she did not win the Nobel Prize.

Kim Sajet: It's interesting, because I looked up their portraits, and we have them in the collection, because you mentioned that she was really a practical do it yourself physicist as versus a theoretical physicist. Look how very different they are. So, both of them are sitting in offices, you'd have no idea that they were physicists. I mean, it could be a banker for all you know, right. They've got the tie, or jacket, they've got papers on a desk. And yet in the portrait we have on hers, you said she's sitting on this drum barrel, and she's looking at a piece of equipment. We added her project to the collection 18 years after we had already had this in the collection, which is also part of the challenge with portraiture as it did favor men.

Jada Yuan: And I don't think that she was upset about the Nobel. I think it passed over her very quickly. And so, she has been recognized a lot over the last 10 years, I think, as people have started to recognize the achievement of women who didn't get recognized during their time. And so, there was a time I think, a few years ago, where I would just, I would log onto Facebook and someone would be sending me a meme of my grandmother or just like some drawing that someone had done, and they were promoting girls and women in science. And you know, I think she would love to see herself in that role as an inspiration to young girls.

Kim Sajet: So, could you describe very briefly, sort of the arc of her life. I know that her mother was a teacher, her father an engineer, who both of them encouraged women's equality. Could you talk a little bit about her early upbringing?

Jada Yuan: Yeah, so she was born in 1912, which was basically right when the Qing Dynasty fell. Her father, Wu Zhong-Yi was a revolutionary who helped with ferrying supplies and other such things, and he really believed in women's equality. And in ending the practice of foot binding girls, which foot binding was where they basically made your foot like almost like a fist and girls had to walk out. I mean, it's really horrible mutilation. And my grandmother luckily escaped that. So, he and his wife decided that

they, you know, they wanted their daughter to get an education and so they founded this co-ed school in her hometown. She was educated there and then she went on to other schools, about an hour or two away from home. But you know, those days, what I'm talking about as an hour was really, you know, ten or twelve hours of traveling,

Kim Sajet: Chien-Shiung Wu discovered a love for physics early on, but she soon hit another ceiling with education. China didn't have a PhD program in physics. So, she set her sights on the United States. She won a scholarship to the University of Michigan, and she left home once again for school. She was only 24 years old.

[MUSIC]

Jada Yuan: I do write about this and I think about it a lot, which was that, you know, in those days to get to America, you had to get an ocean liner that took a month to get across the ocean. And she got on that ocean liner and she waved goodbye to her parents, and that was the last time she ever saw them.

Kim Sajet: A year after Chien-Shiung Wu left for the United States, the Japanese army laid siege to Nanjing and massacred 10s of 1000s of Chinese civilians. Then came the Second World War, which hampered her ability to communicate with her family. And then came the Communist takeover of Dong and the Cultural Revolution. Intellectuals were publicly humiliated and sometimes killed. Scholars like Dr. Wu could not go home. When we come back, how Dr. Wu made her big bang on the other side of the Pacific.

[MUSIC]

Kim Sajet: Hi, listeners, I'd like to make a quick pitch for your support. If you enjoy the podcast and you believe as we do that it's important to draw a fuller picture of our American story, please consider donating online. Your support helps us to bring the hidden stories of remarkable people to life. And any amount that you can give to Portraits is so deeply appreciated. You can find out how to contribute at our website at npg.si.edu/donate.

Kim Sajet: Chien-Shiung Wu arrived by ocean liner in Berkeley, California in 1936. And she quickly found two things that attracted her. The first was Berkeley cyclotron particle accelerator. And the second was her Berkeley tour guide, a Chinese physics graduate student who went by the name of Luke Yuan. Her plans to study at the University of Michigan went out the window, they would marry and have a son, and he would have a daughter, and she's my guest today. Jada Yuan.

Jada Yuan: You know, I don't know whether it was my grandfather or the fact that Berkeley was this hotbed of physics. And it had the cyclotron there that really made her stay. There was also, she found out that the University of Michigan didn't let women walk through the front door of their student union hall. So, she really didn't want to be there. She hadn't had to face that kind of discrimination in China, which I think is interesting.

Kim Sajet: Yeah, very interesting.

Jada Yuan: Yeah. So, you know, she felt like very much an equal citizen, at least in academic circles in China.

Kim Sajet: I love this quote. She got her PhD from Berkeley in 1940. But the quote from the Oakland Tribune article says this: "a petite Chinese girl worked side by side with some top U.S. scientists in the laboratory studying nuclear collisions. This girl is the new member of the Berkeley physics research team. Ms. Wu, or more appropriately, Dr. Wu, looks as though she might be an actress, or an artist or a daughter of wealth in search of occidental culture. She could be quiet and shy in front of the strangers, but very confident and alert in front of physicists and graduate students" That passage to me speaks of all sorts of interesting tropes. Right? And you write about this too. This idea of her always being described as beautiful. Occidental comes into this sort of exotic Asian woman.

Jada Yuan: Yeah, I don't know. It talks a lot about the lens in which she was viewed, which was, you know, she worked with men and she was surrounded by men, and they saw her a certain way. And maybe that was the first thing they saw. And then they learned how sort of fierce she was. But yeah, so she met my grandfather. And, you know, when I knew them, they had a very devoted relationship. I think he mainly did the cooking. He drove her everywhere. He was a physicist in his own right and doing a lot of work at Brookhaven National Laboratory. He founded the Synchrotron Radiation Center in Taiwan. Her career sort of took precedent, she needed to have a supportive spouse. But yeah, they were, I mean, they were very affectionate. They would speak in Chinese, often to each other in front of me. And I never knew what they were saying to one another.

[MUSIC]

Kim Sajet: I have in front of us now a portrait of Albert Einstein and Robert Oppenheimer and it was made in 1947 that's in the Portrait Gallery's collection by Alfred Einstein. And of course, these are two people who were bound up in what we now know as the Manhattan Project.

Separate Audio Clip: "The atomic bomb process was developed in widely separated areas. Even the 1000s of men and women working on the project had no idea of the staggering energy they were to release"

Kim Sajet: It was on the basis of Einstein's recommendation to President Franklin D. Roosevelt that the U.S. government started investigating a way to create a nuclear weapon out of fear that they would be beaten to this by the Nazis in Nazi Germany. Your grandmother was involved in that research?

Jada Yuan: Yeah, as you said, it was a secret project based in Los Alamos, New Mexico, which is where I'm from, and there were branches all over the country where people were working, kind of remotely, as we are now working on these experiments. And basically, she'd been at Berkeley, she couldn't get hired at Berkeley. It was right in the middle of the time when the Japanese were being interred and the Chinese Exclusion Act had become even more severe. And there was a lot of discrimination against Asians in America.

Kim Sajet: In other words, even though China was also fighting the Japanese, Dr. Wu found herself caught up in a racist backlash.

Jada Yuan: And my grandmother decided to come out east. She got a job at Smith. Then she got a job at Princeton, teaching naval students. Basically, because all of the male scientists had been recruited into the war effort. So, Princeton finally hired women to work there. And then she finally got a call to go do an interview at Columbia. And she got grilled I think for a full day. And then at the end they said, well, would you like to know what we're working on? And she said, well, if you didn't want me to know what you were working on you should have erased the blackboard.

[LAUGHTER]

Kim Sajet: That's hilarious. Yeah, so she knew the whole time what this was about.

Jada Yuan: Yeah, so she got she got hired right away. And she developed a method for separating fissionable uranium from non-fissionable uranium. So, she basically developed a method for them to get mass quantities of the field that field the bombs, but a lot of it was very remote and abstracted. Oppenheimer was actually a friend of hers from Berkeley, but he was really in the thick of things and seeing the tests and that sort of thing.

Kim Sajet: Yes, she called him Oppy, is that right? She had a nickname.

Jada Yuan: Yeah.

Kim Sajet: Her nickname was Gigi, is that true?

Jada Yuan: JJ.

Kim Sajet: JJ. Okay, Oppy and JJ. It's interesting to think of these people having nicknames. But you know, what we now know, as the Manhattan Project really started in 1942. And it really took them about three years, before they built the bomb in July of 1945. And then, in fact, only a month later, on August the sixth, two bombs were dropped on Japanese cities in Hiroshima and Nagasaki. And I think it's sort of interesting because you know, there's much talk about you know, what was the impact of the nuclear bomb being dropped and obviously killing estimated immediately, at least 80,000 people and then hundreds of thousands later died of some form of radiation poisoning. It also ended World War Two. I can say from personal experience, my parents were interned in Japanese camps in Indonesia. And as soon as the bombs went off, they were all afraid.

Jada Yuan: Wow.

Kim Sajet: And so, there's a lot of debate, of course, about the sort of awful loss of life that happened. And at the same time, of course, you know, how many more people lives maybe were spared as a

result of the bomb and all the rest of it. But you know, did she ever talk about it Jada? What was her opinion about the Hiroshima and Nagasaki? About the dropping of the bomb? Was it anything ever discussed in your family?

Jada Yuan: She certainly never talked about it with me. And I think that most people who come from families that have lived through war and destruction or who, you know, come from immigrant families, especially Asian immigrant families know that like, we don't talk about this stuff. Emotions and, you know, opinions about controversial events are not really discussed. I do know that when she met with Chiang Kai Shek, which came later in the 70s, she discouraged him from starting nuclear weapons programs in Taiwan. So, she did speak out against it. Many physicists, and we know that Oppenheimer definitely did, had very complicated feelings about their part in creating this thing. They were kind of working in a scientific vacuum. They knew what they were working towards, but they didn't know how it would be implemented and what their governments would do.

Kim Sajet: Dr. Wu's famous parity experiment came years later, in 1956. The findings were announced by the American Physical Society.

Jada Yuan: You know, the room was packed so much that like people were basically swinging off the chandeliers. I can picture that room. I can picture like a giant lecture hall. And all these people just like clamoring, like hanging on to pillars and things like that. And I do imagine that there are probably almost all white men. Like I just can see my grandma being pretty much the only woman and only Chinese woman in that room.

Kim Sajet: The only woman, the only Chinese woman and a person cut off from her homeland by war and famine and revolution. I think it's worth mentioning here that we recently reviewed our inventory and found that more than 90% of the portraits of scientists in the national collection are men. Luckily, there's been a bit of a course correction lately. In 2021, for example, a separate portrait of Dr. Wu was put on the forever stamp.

Jada Yuan: I love the stamp so much. It's an egg tempera painting by a Brooklyn based artist named Ken Mac. It's a painting of a portrait photograph she sat for; I think probably in the early 80s. She has this beautiful black and white keep out dress on and she has her hair in this up do, which is an up do that I recognize. And I think in the article I call it an achievement of physics itself, which I just never understood like how her hair always looks that perfect. But she also has this very wise half smile. I mean my grandmother was incredibly smart and incredibly observant and quite kind. She could be cruel at times, too. I mean no one is uncomplicated. But she always seemed to have like a little joke or a little something inside, a little assiduousness, and I see all of that in her portrait on the stamp. I love the stamp. I think it's really beautiful.

Kim Sajet: And I think you also arrive very clear eyed about the fact that you know, she was very dedicated to her work, and that maybe upon reflection, took being a parent differently than others. I think you talk about the fact that your father, her son, was left to fend for himself on many occasions. And we all have that, right. Everybody has their foibles and their complexities. How does that put it in context for you, when you see things like stamps?

Jada Yuan: Yeah, and she was not necessarily around that much when he was a kid. He was raised mostly by a nanny. And you know, his father wasn't around that much either. You know, there are these times when my grandmother was deep at work in her lab and I think my dad would call the lab often and say he was hungry. And she would say, well, he knows where the can opener is. That's for my dad to wrestle with. And it's for me to empathize with my dad.

Kim Sajet: Yeah. There's this wonderful portrait of you, or it's really a family snap. I imagine this might have been a Kodak camera moment where you were you're a baby in the lap of your grandmother. And you're wearing this little red romper suit. But what I love about it is she's looking out to the person taking the picture and she's absolutely glowing. She is so happy to be holding you. It must be a very treasured photograph.

Jada Yuan: It is, it's like my Lion King photograph. She's like holding me-

[LAUGHTER]

Kim Sajet: Yeah, exactly. Like she's presenting you to the world. She's holding you under your arms and you're looking somewhat startled.

Jada Yuan: That's sort of what I think of when I think about my grandmother. It's not the scientist. It's not, you know, world recognition. It's just this woman who was very loving to me and cared a lot about my future. And I often talk to people about how like, I didn't learn a lot of Chinese but you learn certain Chinese words, Chinese phrases like "chuckwalla", which means like I already ate. I don't need any right now.

[LAUGHTER & MUSIC]

Jada Yuan: Like many children who come from families of immigrants, or from families of scientist, or families who live through war and destruction, I didn't realize how little I knew of her life until it was too late to ask. Memories merge. Our family stories have been retold so many times in official accounts and biographies that it is unclear which versions are true. The past as a closed chapter. The first generation works to distance itself from the old ways: the language, the food. Second generation grandchildren like me circle back around yearning to know more about where it all began.

Kim Sajet: A very special thank you to Jada for sharing her grandmother's story. And don't forget to check out her article in the Washington Post. It's called discovering Dr. Wu. And a postscript, Dr. Wu eventually was recognized for her groundbreaking parity experiment. She won the inaugural Wolf Prize in Physics. However, that was 20 years after her colleagues had won the Nobel. You can see the images we discussed in your podcast app or on our website at npg.si.edu/podcasts. This episode was produced by Ruth Morris. Our podcast team also includes Justin O'Neill, Ann Conanon, Deborah Sisum, Rebecca Ortiz-Hernandez and Rebecca Kasemeyer. Our music is by Joe Kye and Breakmaster Cylinder. Our engineer is Tarek Fouda. Until next time, I'm your host, Kim Sajet.

[MUSIC]