

AirSpace Transcript Season 9, Episode 6: Star Search

Emily: So Matt, when you and I are famous, do you think, do you think the Air and Space Museum will make a podcast about you and I?

Matt: Um, it would have to be like, we get, you know, famous for something else though. Right. And then people are like, did you know they also worked at the Air and Space Museum?

AirSpace theme in and Under

Emily: Welcome to AirSpace from the Smithsonian's National Air and Space Museum, I'm Emily

Matt: And I'm Matt. Aviation and spaceflight have a lot of celebrities from Amelia Earhart to Neil Armstrong, Bessie Coleman, Sally Ride. But there are some celebrities of air and space that are a little less obvious.

Emily: Today we're introducing you to a couple of celebrities with hidden air space ties and one who was very important to 20th century spaceflight with surprising ties to celebrity. That's today on AirSpace.

AirSpace Theme up and out

Matt: So the first person we're going to talk about today you probably already know and love because she's been on television, I mean, my whole life, and even now that she's no longer with us, she's still showing up in new shows, being portrayed by the likes of Meryl Streep¹ and other famous actresses. It's the famous TV chef Julia Child. And what you might not know about Julia Child² is that before she got on television as a chef, she had a little bit of a clandestine career in espionage and intelligence³.

Emily: Well, we can neither confirm nor deny exactly what she did, um, and how much of a spy she was or she wasn't. But a lot of her work well, we're sort of told had a lot to

¹ <https://www.imdb.com/title/tt1135503/>

² <https://www.pbs.org/food/chefs/julia-child>

³

<https://www.cia.gov/legacy/museum/exhibit/the-office-of-strategic-services-n-americas-first-intelligence-agency/>

do with more sort of typing and secretarial work, um, there were some interesting projects that she got to work on that had a lot of implications for aviation and space flight.

Matt: That's right. So to learn more about Julia Child's career and how it was shaped by World War II and her life in the precursor to the CIA, we reached out to one of our friends at the Smithsonian National Museum of American History.

Paula: My name is Paula Johnson⁴. I am a curator of food history at the Smithsonian's National Museum of American History.

Matt: For folks who may not know a lot about Julia Child, and it's kind of hard to imagine there are people who don't know at least something about her, but who was Julia Child?

Paula: Julia Child was an American cooking teacher, cookbook author, and television star who was tremendously influential in changing the way Americans cooked, ate, and even thought about food.

Matt: So, before Julia came on the scene in the 1960s, she obviously had a lot happening in her past before that, that kind of created the Julia Child that appeared there. And one of those things was her service in the OSS. How did she end up working there? What was her job?

Paula: With World War II looming, she ended up like many young and single women at the time she answered the call, she moved to Washington D.C. to be a part of the war effort in some capacity. She took a job in 1942 as a senior typist in the research unit of the Office of War Information at the Department of State.

Um, but from there she applied for a job with the Office of Strategic Services and became a junior research assistant in the office of the director, whose name was William Donovan, who's known as Wild Bill Donovan⁵. Colorful character. The OSS was America's first espionage unit and is the forerunner of the Central Intelligence Agency, the CIA⁶.

⁴ <https://profiles.si.edu/display/njohnsonpa1102006>

⁵ <https://www.cia.gov/stories/story/the-legend-of-wild-bill-how-donovan-got-his-nickname/>

⁶ <https://www.cia.gov/stories/story/julia-child-and-the-oss-recipe-for-shark-repellent/>

Julia's first job at the OSS was as a research associate. She spent most of her time typing up names and addresses of government officials, a job that kind of proved really tedious, but it helped create important files that were used and continued to be useful in the agency's work.

Matt: Wow, so, I mean, it's already surprising to hear that Julia Child worked for a clandestine government agency, but she also worked on some surprising projects while she was there, right? Can you tell us about the shark repellent?

Paula: Sure, sure. According to documents in the national archives as more World War II missions were being conducted over shark infested waters, the threat of shark attacks presented a real mental and psychological hazard to crews and passengers aboard the troop transports, combat ships, and, of course, aircraft⁷.

Researchers apparently tested over 100 different substances and found some promising leads. They, uh, used extracts from decayed shark meat, some organic acids, things like copper sulfate, copper acetate. According to these sources, after a year of testing, the most effective substance turned out to be copper acetate, and there was a 60 percent rate of warding off shark bites. I do not know how they, how they tested this.

But the copper acetate was mixed with black dye and formed into kind of a cake, which apparently smelled like dead shark when it was released into the water. Um, the cakes were stored in boxes with metal screens that permitted the repellent to spread when submerged in water.

And apparently the box would be attached to a life jacket or strapped to a person's leg or arm. And some sources claim that the repellent worked for between six and seven hours. Again, I don't know how they tested that. Well, there was a lot of skepticism about the repellent, especially in situations where a frenzy of sharks, um, was present.

But still, the media picked up on the invention, and it, it gained some notoriety. Many years later, Julia was interviewed about her work in the OSS, and she said, um, she said, and I quote, 'I must say we had lots of fun. We designed rescue kits and other agent paraphernalia. I understand the shark repellent we developed, we developed is being used today for downed space equipment. Strapped around it so the sharks won't attack when it lands in the ocean.'

⁷ <https://www.washingtonpost.com/history/2022/05/02/julia-child-hbo-oss-sharks/>

Now I can't verify that but I bet somebody at the National Air and Space Museum might know.

Emily: Ok, we looked this up for you. This is true⁸. The repellent, which was named Shark Chaser, was carried on Mercury and Gemini missions, but not on Apollo.

Matt: One of the things that I think is great is that at some point, I think in the late seventies or early eighties, she recorded a video for the National Air and Space Museum where she taught people how to make the primordial soup from which life could emerge. Do we know much about why she did that, how she did that? You know, Cause it is such a great video, you can still find it on YouTube.

Paula: Yeah, again, she was wildly popular at this time. And I just love the video because it is kind of done in the same tone and the same style as her cooking shows. You know, the same music, the same, you know, font. And she's right there in her home kitchen, um, and she welcomes viewers in the same way that, you know, she welcomed fans to her cooking shows with something like, you know, we're doing a recipe for the chemical building blocks of life today at the Smithsonian,

Julia Child's music fades up⁹

Julia Child from Primordial Soup Video: *Welcome to the National Air and Space Museum. I'm Julia Child and today I have turned my kitchen into a biochemical laboratory to show you what some scientists think could have been nature's recipe for life on this Earth and perhaps life in the rest of the universe.*

Paula: I mean, that was the kind of thing that appealed to her, this, you know, we're on this together, we're exploring this together, let, let's go! Let's do it! And for me, hilariously, because I have spent so much time with Julia Child's kitchen and all of the over a thousand parts and pieces of the kitchen that we collected.

I know that stuff very well, and I can see her, um, tracing, uh, the process of water evaporating into the atmosphere, encountering energy, then recirculating and transforming into the building blocks of life. And she does this with a chef's knife. You

⁸ <https://airandspace.si.edu/stories/editorial/spaceflight-and-surviving-shark-attacks>

⁹ <https://www.youtube.com/watch?v=PHJDQY4mWFg>

know, she's wielding the chef's knife, and then she takes a kitchen spoon and you know, finishes her diagram. It's just vintage Julia.

Matt: Yeah, it's a very fun video to watch. I think

Paula: Yeah, it, it really is, She's a performer. She's, she knows how to use tools of humor and, you know, uh, props to get people interested. I just, you know, I just love that video too. *laughs*

Emily: Our next celebrity was really well known in her time for doing some inventing on the side. In the 1940s, Hedy Lamarr¹⁰ was better known for being a very famous Hollywood actress, but the things she invented made a lot of our modern conveniences possible.

Matt: So to learn more about her story, Emily, you talked to our curator of computing, guidance, and navigation, Dr. Andrew Mead McGee¹¹.

Andrew: I am Curator of Computing at the Smithsonian Institution's National Air and Space Museum.

Emily: So obviously we're talking about Hedy Lamarr, but that's not necessarily a household name for a lot of folks. Can you describe who Hedy Lamarr is?

Andrew: In the 1940s, Hedy Lamarr would have been a household name in America. The so-called 'most beautiful woman in Hollywood' was an Austrian immigrant to the United States, discovered by Hollywood mogul, Louis B. Mayer and signed to MGM studios. She appeared in many popular films of the period, often in an exotic seductress role.

Emily: So Hedy Lamarr was definitely better known for her acting. How did she get into inventing?

Andrew: So, Hedy Lamarr's drive to invent came in part from her childhood, when her father, who was a businessman in Vienna, would take her around to see construction sites and technological objects around the city and they would talk about them.

¹⁰ <https://www.hedylamarr.com/>

¹¹ <https://airandspace.si.edu/people/staff/andrew-meade-mcgee>

When she became a well regarded actress, she was frustrated by the fact that she was seen for her face and her beauty, and not for her mind. She was always told to be silent.

This carried through in her first marriage. Where she was married to an Austrian arms magnate. And she was often brought to these elaborate dinner parties with diplomats and representatives of warring nations in Europe in the 1930s, where she learned about weapons and particularly she learned about torpedoes.

This would come into play in her Hollywood years when she would frequently host salon style dinners with interesting people. And once seated at a dinner next to a composer named George Antheil, the conversation turned to torpedoes. And Hedy Lamarr says, I know about torpedoes. I know about real torpedoes.

And one of the chief problems with guiding torpedoes during this period is there's no way to control where they go. And if you apply a radio device, it's relatively easy for the target of the torpedo to jam the frequency and to block that torpedo.

Now her dinner companion, George Antheil, was an avant garde composer who had been preparing for some time, an elaborate experimental piece. A ballet that employed 16 different player pianos, that used a rolling scroll of commands, essentially, uh, a punch card sheet with, uh, program commands of when to play.

And as Hedy described the issue of how wished she could find a way to allow frequencies and radio to skip so that you could block someone jamming a signal, Antheil mentioned, well, he'd been working on a proposal for his composition to use these player pianos in an alternating fashion.

And Hedy connected these details, this particularly odd form of musical composition with her interest in finding a way to control movement from radio frequency to radio frequency. And what she ended up proposing is a system that allows for frequencies controlling a torpedo to shift many times a second¹².

The mechanism is purely mechanical, and it's very similar to the inside of a player piano and what it allows for is the radio signal to come in to the torpedo, be swapped among

¹² <https://www.aps.org/archives/publications/apsnews/201106/physicshistory.cfm>

multiple frequencies very quickly, thus preventing the person on the other side from jamming it¹³.

And of course, Antheil and Hedy Lamarr submitted this, had it approved, and then assigned it over to the United States Navy. They essentially gave away the rights of this to help support the war effort.

Emily: What happened to their patent once they gave it to the Navy?

Andrew: Navy engineers had no idea what to do with it. They couldn't envision a way of altering the mechanism that Lamarr had outlined. They jokingly said, "how can we stick a player piano inside a Torpedo?" So they shoved the paper aside, dismissed it, essentially patted Hedy Lamar on the head and said, "well, why don't you go sell war bonds for us? That's what you can do."

The patent was rediscovered after it had expired in the late 1950s by engineers from Sylvania. And some of the engineers reviewing this realized what you just need to do is slightly alter the mechanism and you can use a thin wire. It achieved much of the same effects through electronic means.

And they realized that they could convert Hedy Lamarr's proposal from a mechanical system to an electronic system. And at its core, that conceptual notion she developed of how to interpret and implement frequency hopping is used today in many ordinary everyday devices¹⁴.

Matt: And Hedy's invention is now the backbone of technologies that we use every day, like WiFi, GPS, and Bluetooth. I mean, your smartphone might not exist if it hadn't been for this.

Emily: And despite not being recognized for these specific inventions while Hedy Lamarr was Hollywood's leading lady, in the 1990s she was recognized by several trade groups for the contributions she's made¹⁵.

¹³ <https://www.cbsnews.com/news/hedy-lamarr-movie-star-inventor-of-wifi/>

¹⁴ <https://jwa.org/thisweek/aug/11/1942/actress-hedy-lamarr-patents-basis-for-wifi>

¹⁵

<https://lemelson.mit.edu/resources/hedy-lamarr#:~:text=Lamarr%20received%20several%20awards%20for.field%20of%20spread%2Dspectrum%20technology>.

Matt: So our last celebrity is not really a household name. But if you've spent any time on the internet on Facebook or Instagram if you get into the memes in the last few years you may have come across her story¹⁶,

Emily: But we're going to make this one a little bit of a slow burn. We're going to leave it to the end to tell you why she's even more famous than you knew.

Matt: And to learn more about this story, We reached out to our colleague, Dr. Teasel Muir Harmony¹⁷, who curates our Apollo collection.

Teasel: I'm Teasel Muir Harmony I'm the curator of the Apollo collection at the Smithsonian National Air and Space Museum.

Matt: Who was Judith Love Cohen?

Teasel: She was an aerospace engineer that worked for TRW, an important aerospace company, for decades of her life, and contributed to a lot of essential programs, in particular the Apollo program.

Matt: And what do we know about which projects she worked on for Apollo? What are the ones that she's said to have contributed to?

Teasel: She was an engineer on the Apollo abort guidance system. Um, and so the, the Apollo program they used for digital computers and the abort guidance system¹⁸ or AGS was on the lunar module and it was designed to support the astronauts in case there was an abort from the Lunar surface, but it ended up being really useful in the Apollo 13 mission for a purpose that people didn't even anticipate. And it was, uh, it was extremely lucky that it was on board.

Matt: So, in the name 'Abort Guidance System,' what does abort actually mean there? What's going on if this is triggered?

¹⁶

https://www.reddit.com/r/Damnthatinteresting/comments/vd8v1f/jack_black's_mother_worked_on_system_that_helped/

¹⁷ <https://airandspace.si.edu/people/staff/teasel-muir-harmony>

¹⁸

https://airandspace.si.edu/collection-objects/abort-electronics-assembly-apollo-lunar-module/nasm_A197_31554000

Teasel: So it was designed to be used, so if the astronauts were landing on the Lunar surface and there was an issue that they had to abort the mission. So say for instance, uh, with the Apollo 11 mission, the astronauts, they were getting really close to the need to abort in that mission.

Neil Armstrong noticed that there were boulders where they were supposed to land, and so he had to take manual control¹⁹ of the Lunar Module and find a new landing site. They had less than a minute left of fuel. They were really close to the need to abort. And so in an instance like that, this, this computer could have been helpful if he wasn't able to find a landing site in time to ensure that they could have aborted the mission basically, and then returned safely to, to lunar orbit.

And then it, it ended up being a critical backup even, um, when there wasn't an abort but, uh, being able to use this extra computer that, that required less energy was really critical to helping the Apollo 13²⁰ astronauts return home safely.

Matt: Let's go into a little more detail about Apollo 13, so tell us what happened there, and for listeners who don't know what happened on Apollo 13, you know, what was the problem, and how did this computer end up being part of the solution?

Teasel: Sure. So with Apollo 13, as the astronauts were making their way to the moon, I think they were about 200,000 miles away from Earth at that point. There was an explosion in, in oxygen tank two in the service module, and what ended up happening is it really crippled the spacecraft.

The astronauts had to lose, use the Lunar Module as a lifeboat, and they had to use the, the Lunar Module's engine to help steer that spacecraft, they had to return home as quickly as possible. They could no longer land. But they also lost a lot of their power source. So they had to, this is where the, the, the computer comes into play here. So they had to basically power down a lot of the systems, but they also had to ensure they used as little power as possible within the Lunar Module as well. But they still had to make sure that they could, um, get home safely.

And, and one of the things that they did is they realized that that this computer was not going to use as much energy, but could still help direct the spacecraft home.

¹⁹ <https://www.space.com/26593-apollo-11-moon-landing-scariest-moments.html>

²⁰ <https://www.nasa.gov/history/afj/ap13fj/19day5-themanualcoursecorrection.html>

So when they had to make corrections on the flight from the Moon to back to the Earth that they were able to use this computer to do that and it used less energy. So that was really critical.

Matt: In general more of these Apollo era stories of women's contributions to aerospace are being told now but we still don't have a great record of exactly what Judith's contributions to the guidance system or other projects that she worked on was, what do we know about what it was like to be a woman working in this field at the time?

Teasel: Yes, I think it's important to highlight what that experience was like as a woman working on the space program in that period of time and, um, She was quite remarkable and had to be quite driven. We know that from what she was able to accomplish. And so she was a junior engineer working at North American Aviation, um, and, uh, taking classes at night to finish her bachelor's degree and then her master's degree at USC in engineering.

And she was able to accomplish that and had kids while doing it. And, uh, and then she, then she was hired, uh, that she worked for TRW and worked on really important programs there.

But this was also at a point at NASA with the Apollo program, because a lot of people working on Apollo were contractors like Judith Love Cohen. Um, about 17 percent of those people were women, but most of that 17 percent were working as, as secretaries. So when it comes to scientists and engineers, it's closer to something like 2 to 3%, you know, very small percentage of, of, of people contributing to, um, science and engineering on the Apollo program were women.

So she was quite unique in that regard. And I'm sure it affected, you know, the, the work culture she experienced. And, and then you see that in her later life after she retires she, she goes into publishing and wanting to, to encourage, um, women and, and girls to go into STEM²¹ and, and recognize that they can have all different types of careers.

And then I, it's worth mentioning that she continued to work through the, the 1960s, and there's this great story that's told by her family, in 1969. So if you, you sort of set the scene, this is, this is the Apollo program that the moon landings is July of 1969.

²¹ https://www.goodreads.com/author/list/16226.Judith_Love_Cohen

She's eight months pregnant then. And the computer system she helped develop was used on the Apollo 11 program. It, it helped the astronauts when they were after they left the lunar surface and they were docking again with a command module in Lunar orbit. And so, and then you get to August and she's working on a problem at work, goes into the office and then goes into labor.

And so heads to the hospital and brings her work with her to solve this problem she's working on. She later on calls her boss and she says, you know, 'I've solved the problem and I've had a baby.' And so this is a great story that her family tells, but it gives you a sense of, of what she must have been like how devoted she was to her work. And probably also what a very exciting time that was in her life.

Emily: To learn a little more about Judith Love Cohen and to explain why we decided she fits into an episode about celebrity connections to air and space, we decided we needed to talk to her sons, Neil Siegal (SEE-gull) and Jack Black.

Neil: Well, my name is Neil and Jack and I are brothers and, and, uh, we're here to talk about our mother who passed away a few years ago, but, uh, was an amazing and interesting person.

Jack: I'm Jack Black. I'm Judy's youngest son. And, um, I take every opportunity, if someone says, 'Hey, we want to do a story about, about your mom.' How can I refuse? Uh, I love it that, uh, her legacy lives on and that people still want to know more about her.

Matt: All right, great. We first learned of this story about Jack's birth from what's been shared on the internet. But we know that the memes aren't exactly accurate. Can you tell us, the story as you heard it?

Neil: So I heard it twice. Um, I heard it on the day that Jack was born from, from our mom when she came home from the hospital. Um, because I think she had thought she had been very clever. She had she had worked through her whole pregnancy.

And she actually went to work the day that she ended up giving birth and she was working on a programming problem. That's one of the things that gets misquoted sometimes. I don't know that she was actually working on the Apollo program. Jack was born in August. And remember the first moon landing was in July, a month before he was born. So the, the part of the Apollo she was working on was done. Right?

And so when she left the office to go to the hospital, Jack was her fourth child, so she knew, knew the signs, right? So she, she, she took a printout of the programming problem she was working on, right? And so when she got home, uh, with the baby, my stepfather went and met her at the, Jack's father went and met her at the hospital.

And, um, brought them home. And she said, um, she called her, she had called her boss from the hospital to tell him that she had solved the problem that she was working on, the programming problem. And oh, by the way, it was a boy, I guess in those days, they didn't always know in advance. Anyway, so she was very proud of that.

So she told that to me when she got home, I was 15 and a half, so I'm old enough to remember. But strangely enough, I became friends with a person who was her boss at the time, many, many years later.

And so he, he told me the story. So I actually got it from both ends of the phone conversation. And of course he told it exactly the same way.

Matt: And Jack, did you hear the story many times growing up or, no?

Jack: No, my mom was not one to, uh, brag about her, uh, achievements. She didn't, uh, Tell, remind me about the incredible feats of intellect while I was being born, uh, but she did tell me once and I heard it more, much more from other people, actually more recently. There's been this resurgence of, uh, interest in, in, uh, in Judy's life and works.

Emily: Neil is Judy's eldest child, who followed her into engineering and computer science. He now works at USC and has had the opportunity to learn even more about his mother's time there.

Neil: USC has told me is that she was the eighth woman ever to graduate from their program. The first one was in 1948. But she went to night school. So she says that the whole time she went to USC, she never saw another female student.

In fact, here's a funny little story. In that corner of campus, I teach there now in the engineering school. So I know that corner of campus as well. Um, she says in those days, none of the buildings on that corner of campus had a women's bathroom. And they had to walk all the way across campus to the, you know, to some other part of the school school because all the bathrooms in that corner of campus were for men.

Jack: Yeah, it's pretty incredible she was able to make it in that world

Neil: Well, she was, Jack, Jack can amplify this, but I would say that her absolutely distinguishing characteristic is that she was completely dedicated to doing what she wanted.

Jack: Yeah, nothing was gonna stop her.

Neil: Nothing was gonna a mere mere people or, or, or whatever, we're never going to stop her from doing what she wanted. No matter what it was, right? And, you know, so she got, she got all interested in, in promoting women in engineering and she did all kinds of amazing things. She just did a lot of things to help promote women in the workplace.

And so, when she retired, she wrote a book called *You Can Be a Woman Engineer*, kind of about herself, but really about the idea that, you know, you little girl, you can become an engineer, too, aimed at like seven year old girls, and she could not find a publisher.

Nobody was interested in this book, so Jack knows what happened. She and her, and her third husband, started a book company, right?

Jack: My stepfather, David Katz.

Neil: Right. So by the time she died, they had done 20, I'm looking at the shelf here, I've got all of them right here, 20 or so books. Uh, you can be a woman engineer, you can be a woman architect, you can be a woman astronomer, all about this theme.

But it all started with, she wrote this little book, and nobody would publish it.

Jack: Really cool books. It's interesting when I think back to when Judy was a kid and, that she got encouragement from her parents, but like Neil says, the main thing was her, uh, drive and her fervent, uh, ambition to do whatever she wanted, you know, and she, she had these interests when she, when she was young and, and nothing could have stopped her.

And I think that kind of carried through her whole life where she had this fire in her belly

Neil: And nothing was going to stop her from getting what she wanted. Right. Nothing.

Jack: yeah, yeah I was always really impressed with her passion and her love of, of, uh, science, but I'm not... I was also a little scared sometimes cause she had this passion and this fire and this temper that sometimes would come up and it'd be like, you know, she was a force of nature. Let's put it that way.

Emily: According to Judy's obituary written in 2016²², she also contributed to the Pioneer spacecraft that went to Jupiter in the 1970s. She worked on the tracking, data, and relay system satellite. And she ended her career working with the engineering team for the data coming from the Hubble Space telescope.

Matt: And if you want to hear more of our interview with Jack and Neil about their mom, there's an AirSpace bonus in our feed now with an extended version of my conversation with them.

AirSpace Theme up and under

Emily: AirSpace is from the Smithsonian's National Air and Space Museum.

It's produced by Jennifer Weingart and mixed by Tarek Fouda. Production help by Erika Novak and Sofia Soto Sugar. Our social media manager is Amy Stamm.

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AirSpace Theme up and out

Emily: So cool. Can I tell you, though, the whole time I was picturing this description of this, um, shark repellent was like a Lush bath bomb, inside a mesh cage strapped to, like, somebody's jumpsuit.

Matt: But it must have, it sounds like it smelled foul, though, like,

Emily: If you weren't already having a bad day,

Matt: yeah, *laughs*

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<https://viterbi.usc.edu/news/news/2016/obituary-judith-love-cohen-neil-siegel-usc-viterbi-engineering-women.htm>

