Interviews of the Margaret MacVicar Memorial AMITA Oral History Project, MC 356

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Catherine Mavriplis – classes of 1986 and 1989

Interviewed by Olivia Steger, class of 2025

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Margaret MacVicar Memorial AMITA Oral History Project

Catherine Mavriplis (SM Aeronautics and Astronautics 1986; PhD Aeronautics and Astronautics 1989) was interviewed on March 20, 2023 by undergraduate Olivia Steger (SB Computer Science and Engineering 2025) via Zoom. Dr. Mavriplis was in her office in Ottawa, Canada, and Ms. Steger was in Cambridge, Massachusetts.

Dr. Mavriplis grew up in Montreal, Canada, and was interested in mathematics and engineering from an early age, leading her to pursue a pure science path in high school. Her father's career as an aerospace engineer for Bombardier exposed her to aircraft development, which motivated her interest in engineering.

Her father decided that she would focus on engineering instead of mathematics, and Dr. Mavriplis received her bachelor's degree in mechanical engineering from McGill University, where she was one of few women in her classes. After graduating, she received several offers to pursue her PhD, but again at her father's request, enrolled at MIT.

At MIT, Dr. Mavriplis was the intramural representative for Aeronautics and Astronautics graduate students and participated in crew, as well working as a summer experience teaching assistant for minority students. Although her degree is in Aeronautics and Astronautics, her PhD research was conducted in a mechanical engineering lab. Her thesis focused on preserving high order precision in computational models of fluid flow leading to adaptive grid methods.

After graduating, Dr. Mavriplis began postdoctoral research at Princeton University, and shortly after, became a professor of mechanical and aerospace engineering at George Washington University, where she was the only female professor in her department. She also worked with the National Science Foundation, NASA Langley, and the University of Oklahoma before becoming a professor at the University of Ottawa. In addition to her professorship, she served as the President of the Computational Fluid Dynamics Society of Canada, the first woman in that role, and as a Councilor of the Canadian Aeronautics and Space Institute.

As detailed in this oral history, besides her research in computational fluid dynamics, Dr. Mavriplis has been an advocate for women in STEM throughout her time in academia. She received several grants from the National Science Foundation for her work advancing women in STEM and was elected as the Natural Sciences and Engineering Research Council of Canada (NSERC) Chair for Women in Science and Engineering. Over the course of her 10 years as the NSERC Chair, she expanded the Focus on Reaching Women for Academics, Research and Development (FORWARD) to Graduate School and FORWARD to Professorship programs to Canada, which she began working on during her time at George Washington University, while developing a wide range of other programs for women in STEM.

Today, Dr. Mavriplis is a professor in mechanical engineering at the University of Ottawa, where she continues to focus on fluid dynamics and the advancement of women in STEM.

STEGER: I was hoping we could start with your childhood. Can you talk about where you grew up and what that was like and what your family was like?

MAVRIPLIS: I grew up in Montreal, not far from Boston, in Canada. And my dad's an engineer, so — and he's Greek, so he was very prescriptive about what I was going to do. I was quite good at math from the beginning, and I loved math in school, so I wanted to study math. My mum's a teacher, and I have two siblings. They're older. I'm the youngest.

My dad worked for an aircraft company in Montreal, which is well known now — Bombardier. When I was in high school, he had very exciting projects to develop new aircraft and I got to see that. It was quite interesting. So instead of going into math, which I wanted to, he told me I was going to go into engineering. It helped that I saw the aircraft being built and seeing that excitement, that helped to steer me towards engineering.

STEGER: Perfect. I had seen a video of you accepting an award where you mentioned your father and mentioned that he spoke to you about a lot of these projects as you were growing up. Can you talk a little bit more about his influence and his approach to learning within your house?

MAVRIPLIS: His approach to learning is always to challenge you. And even when we were small, he gave us these logic problems and stuff like that. We were pretty responsive to that. And all three of us, it's like a competition. My mother is the opposite. Although she's good at sports and stuff, she's an English teacher, and she's more of a, you know, your inner thoughts kind of person. It's an interesting mix of the two.

STEGER: You had mentioned that you had really enjoyed math. What was your schooling like? What was STEM like for girls when you were growing up?

MAVRIPLIS: I went to an all-girls school through the French system. The French government has schools all over the world, and one in Montreal. We had a lot of math, because the French are very strong at math. I had 10 hours of math a week in my last few years of high school, which is a lot more than other people. That really set me up well for university. All my life has sort of been between math and engineering.

Just for a comment on the all-girls school, because now we know that some girls feel discouraged in middle school or drop out of sciences in middle school and high school. If you're just with girls, you don't know the difference. We had really good math teachers. Our physics teachers weren't very good, unfortunately.

It's funny. One thing that I thought was funny is I went from an all-girls French school to an all-guys English engineering class. Quite a contrast.

STEGER: Oh, that's really interesting. You didn't seem to find yourself alone very often. Were there a lot of girls who were also interested in math and the sciences when you were in school?

MAVRIPLIS: We were streamed in the French system, and they used to be A, B, C, D. A was literature. B was economics. C was pure sciences, so I was in that group. D was health sciences. I mean, even though, I have to say, the pure sciences group was a lot smaller than the others. A lot of people go towards medicine, if they're good in sciences. But I think at some point, people decide they like to learn things by doing, and others like to learn — they're good at memorization — so I think chemistry and health sciences, some people go that way. People who don't particularly want to remember formulas are more in the math, physics area. So that's what I did.

STEGER: That's really interesting. So how did you end up at MIT after doing your bachelor's in mechanical engineering at McGill? Did you have any other choices you were really considering?

MAVRIPLIS: I did. And again, I thought, because my dad had made me go to engineering, and I thought, OK, now I'm going to do what I want and go back to applied math. I did have an offer with a very famous person at Rensselaer Polytechnic — RPI. It was sort of aerospace related, but more on the applied math side. And, I had a very nice offer at Cornell. I wanted to do computational modeling of fluids, which I still do. And, there was going to be computational modeling of magma flows in volcanoes, which was interesting, but it wasn't sort of — I wasn't really a geoscience person at that time. I would probably be very interested in it now.

In the end, I didn't have a choice. My dad said, “You're going to MIT in aerospace.” I also finished in December, which is odd — 3 and 1/2 years of undergrad. Applying in December is different. The funding schemes for getting your research assistantship and stuff are more difficult. But anyway, it wasn't as clear at MIT that I was going to be well supported. That's why I would have rather gone to the other places. But, my dad sort of made me take a few risks a couple of times in my career. And that was one of them. But anyways, it worked out fine.

STEGER: After you decided to come to MIT — was there any culture shock coming here? And where did you live in terms of the campus?

MAVRIPLIS: I lived in Ashdown House, which is right across the street there. That was different, because in Montreal I'd had an hour commute my whole life to school. That was, like, oh, wow, I'm only 10 minutes or five minutes away. It's quite different. It is a bit difficult with the social scene, I have to say. Undergrad is quite different than grad at MIT.

There are a lot of very, very, very smart people, but not so well-adjusted socially. I found that difficult, so I became the intramural representative for Course 16 (Aeronautics and Astronautics) graduate students. That was good because I had to go around and get graduate students to join the softball team or the volleyball team or whatever team it was. And I did rowing — I did crew on the Charles, sailing. I was in the Graduate Student News, I believe. It's a kind of newspaper.

I supplemented with a lot of stuff. But graduate school is kind of — people were expected to work all the time. It was a bit of a struggle to say, no, I actually do feel like I have to do some other things. I can't just work, you know, 16 hours a day, every day of the year. It's just too much.

STEGER: It sounds like you found a lot of other friends or people you could talk to through those intramural activities.

MAVRIPLIS: Yeah. It was good really because some people come from other countries and maybe they just keep to themselves. When we got them on the teams, we realized, “Wow, you guys are really good volleyball players.” It opened up conversations more than it would have normally because at the time — I don't know if it's still that way — I mean, I did come back in 2005, and it was still that way. It's going to seem like a long time for you, but I was there in '84 to '89. From '89 to 2005, it's still quite a distance, right? It's almost 20 years.

I felt it was still very much, for graduate school, that people were mainly in these labs, and they knew only the people in their labs, and they didn't know other people. This is before email at least in '84 to '89 — no internet and things like that. If your lab was congenial, that was good. But if it wasn't, it was difficult.

STEGER: That’s really interesting. On the academic side of your experience, when you were in the graduate program, how many other women were there? Were you the only one? What percentage of the department was women? Did you have any female professors?

MAVRIPLIS: There was just one woman professor in the Aeronautics department, Sheila Widnall. [Sheila Widnall; SB 1960, SM 1961, and SCD 1964, Aeronautics and Astronautics; MIT's Associate Provost from 1991-1993; MIT Institute Professor Emerita; trailblazer in aerospace engineering who was appointed in 1993 as Secretary of the Air Force, becoming the first woman to lead a branch of the U.S. military.] Other women, there weren't many, so there were some who came after me, a couple a semester before me, but most of them left after their master's. There was one or a few who stayed for a PhD, Dava Newman, who's a professor there. [Dava Newman; SM 1989, Technology and Policy, SM 1989, Aerospace Engineering, and PhD 1992, Aerospace Biomedical Engineering; Director of the MIT Media Lab since 2011; MIT MacVicar Faculty Fellow; expert in aerospace biomedical engineering who was appointed in 2015 as the 13th Deputy administrator for the National Aeronautics and Space Administration.] I think she was a PhD student, more on the space side. On the space side, it was a little different than aeronautics side. I did go over to a mechanical engineering lab, even though my degree is from aeronautics. In that lab, a lot of people were married. It was a very different dynamic. It was better in terms of work-life balance and getting along with people. And there, there were a couple more women because we had an MD-PhD program with Harvard. There were a few women in that. I'm trying to think of if there's more than one, maybe just one.

In my field, there were two other women getting their PhDs. One is Cristina Amon. [Cristina Amon; SM 1985, SCD 1988, Mechanical Engineering; pioneer in computational fluid dynamics for thermal design solutions who was appointed in 2006 as the 13th and first female dean of the University of Toronto Faculty of Applied Science and Engineering.] She's been the Dean of University of Toronto for many years. She's quite a role model, I have to say.

STEGER: I know you teach computational fluid mechanics now under the mechanical engineering department. Besides working in that mechanical engineering lab, did you have any other mechanical engineering experience at MIT specifically?

MAVRIPLIS: I'm not sure what you mean. I mean, my master's is in aeronautics. I mean, both my degrees are in aeronautics, but my advisor was Wes Harris, who's still there. [Wesley Harris; Charles Stark Draper Professor of Aeronautics and Astronautics at MIT.] He's a Black professor and he did a lot for the Office of Minority Education. I think he set it up at MIT. That was a very interesting part of my experience at MIT. He had a summer experience for minority students. I was the TA for that and helped high school students design

things. I think one of the most challenging things I did was play basketball with nine huge Black men.

I took a course in ocean engineering, which was fun. I took a lot of math courses. Again, I like math, so I had Gil Strang, who was a professor in math, on my committee for my PhD. [W. Gilbert Strang; SB 1955, Mathematics; MathWorks Professor of Mathematics at MIT.] I tried to roam around and get as much as I could out of that place.

STEGER: So back in Course 16, how were your classes? What were the other students and professors like? I know you had mentioned there was a lack of work-life balance for the graduate students. But how were the other students? How were the professors? How was your overall experience?

MAVRIPLIS: It was good. I mean, there were some — all the professors are very, very good technically. Mark Drela, who's still a professor there — he was a student at the time, but he became a professor, I think, while I was still a student — was wonderful to be around. [Mark Drela; SB 1983, SM, 1983, PhD 1985, Aeronautics and Astronautics; Terry J. Kohler Professor in Aeronautics and Astronautics and Director of the Wright Brothers Wind Tunnel at MIT.] It was a congenial group in some ways, in computational fluids.

Courses were hard. We had a library. We still — they still have it, I guess, but you didn't get papers online at all. You had to go to the library to check out the actual paper, and one student would run to the library before us and take all the papers out, which was really mean.

Maybe he was more in tune or I don't know what. By the time we would clue into which papers we needed, we'd go there and find out he'd taken them all. Some people weren't too collaborative, but others were.

STEGER: I know you had just mentioned your advisor being really helpful and TAing that summer course. Did you have any other mentors or advisors while you were here? What was that like?

MAVRIPLIS: Yeah, basically on my committee, because you need a committee of three or four professors for your degree. They were all quite good, I have to say. And then, I also took courses with Nick Trefethen in math. [L. Nicholas Trefethen; Assistant and Associate Professor of Applied Mathematics at MIT from 1984 to 1991; Head of Oxford University’s Numerical Analysis Group.] He was quite good. So, yeah, it's really quality people, and very helpful for getting

through the degree and the material and learning a bit about the field, for sure.

STEGER: After your experience doing your master's, what made you stay for your PhD?

MAVRIPLIS: Yeah, because a lot of the other girls left. I just enjoy a challenge, so if there was one more thing to go for, then I was going for it. Also, I really wanted to do a better job than I had done at my master's. I didn't feel I got to do what I wanted to do. So then, the next degree was better. I got to do something.

I was really lucky, actually, now that you reminded me about other people. A professor from France came by on sabbatical for a year in my professor's lab. And my professor was Tony Patera in mechanical engineering. [Anthony Patera; BS 1978, SM 1980, Mechanical Engineering, PhD 1982, Applied Mathematics; Ford Professor of Engineering in Mechanical Engineering at MIT.] And because I knew French, and because I'd studied math in France, I had more math than other people, so this was perfect when he arrived. We worked really well together, the three of us. My thesis was certainly quite different than the other people's theses in that group, so I was pretty happy with that.

STEGER: Would you like to talk a little bit more about your thesis?

MAVRIPLIS: You're a computer scientist, so you might get it. But we do computational models of fluid flow, any kind of fluid flow. It could be aerodynamics for wings of aircraft. It could be blood flow. It could be combustion. I did some flames later in my life and other things.

My advisor, Tony Patera, was a student of Steven Orszag, also in math at MIT. [Steven Orszag; BS 1962, Mathematics; Professor of Applied Mathematics at MIT from 1967 to 1984.] Orszag is super famous for spectral methods, so it's a high order numerical method that's more precise than a lot of other methods that people use. That was another thing: the people in aeronautics were using advanced methods at the time, but this was even more advanced because it had a lot more mathematics in it for precision.

My advisor took the finite element method, which is used by a lot of people in — more in solid mechanics. He put the spectral methods in it to make it more precise, so we do very high-definition simulations of flows that are becoming turbulent.

My thesis was to work on the mathematics to allow it to be more practical, more robust, because what you do is you break up the domain into elements, so finite elements. And then we had these high order — they're just polynomials or Fourier functions in the elements, but if you have elements that don't line up or you have different levels of precision in different areas of your grid, then the mathematics have to be ensured so you still get the high precision. I worked on making sure that high precision was conserved. Kind of mathematical. Then, I also worked on making it practical by making some error estimators to write an automatically adaptive method that would make the resolution or the grid as the flow goes along. That was kind of novel at the time, and that was my thesis.

STEGER: So, you got to work a little bit more with the math side, which you enjoy.

MAVRIPLIS: Yes. Yes. For sure.

STEGER: OK. And did you stay here between your master's and your PhD, or did you take some time off?

MAVRIPLIS: I don't even know if I even had a day off. [LAUGHS] I think I even started the PhD before the master's was finished because my advisor left for a while, and then he came back later. I had to finish while he was gone and then hunt for another advisor at the same time, which was difficult. But that's what happened.

STEGER: After you completed your PhD, you were at a bunch of different schools — Princeton, George Washington, and the University of Oklahoma — before becoming a professor at the University of Ottawa. What were those experiences like?

MAVRIPLIS: What was interesting, it might be interesting to your stories there, is that a lot of us were looking for jobs at the same time, MIT PhDs. I got a lot of interviews because at the time a lot of universities were having a position for a women professor. I got a lot of interviews, but not many offers, unfortunately. I had a job offer at Boeing, but I didn't take it because they offered me $7,000 less than a colleague of mine from MIT, similar degree. And they offered me $7,000 less.

And when I said something, the guy was like, oh, none of your business, or something like that. And just no issue, so I said, nope, not going there. Then later, about 25, 20 years later, I heard that there was a class action lawsuit of all the women at Boeing, so kind of glad I didn't go.

I wasn't sure what to do. I had an offer actually, at the University of Toronto, so to come home to Canada. I was pretty young when I finished. I was 26, so I thought, well, maybe I'll do a postdoc. At the time, engineers didn't do a lot of postdocs. People in physics and chemistry and biology did, but not really engineers. But they might do one year. I had the opportunity to go work for this famous mathematician. Orszag was my advisor's advisor, and he'd moved to Princeton in the meantime, so I went there for a year. That was nice because now he's in math and not in engineering. Although, he did similar work.

There were a lot of postdocs there who were very smart and well trained. And we were all looking for jobs at the same time, so another difficult time to find a job. But eventually, I did get an offer from George Washington, and then I took that. Later, I got an offer from UC Irvine. In September, they called me, and they said, do you want to come now? And I was thinking, well, I just started here. I can't just do that to them and leave.

So anyway, I went to George Washington. And I was the only woman professor there in my department. After a few years, even when I first got there, not right away, but after a few meetings, I realized there were some women in computer science, and they were quite energetic and dynamic. I eventually worked with one of them, Shelly Heller, and even with the other one, Dianne Martin. [Shelly Heller; emeritus professor of computer science and the founding director of the SEAS Center for Women in Engineering at George Washington University; C. Dianne Martin; director of the Cyber Security Research and Policy Institute at George Washington University; recipient of the Ada Lovelace Award; former programmer at IBM who worked on the Apollo 11 and Apollo 8 missions, helping put the first man on the moon.] We co-taught a course. But with Shelly, we've had a very long association of working for Women in STEM.

We've had a lot of grants together and we're just a good team. She's very creative. I'm a more organizational-type person. And we've had a lot of fun together.

STEGER: Would you like to speak a little bit more about what it was like being the only female faculty member at George Washington?

MAVRIPLIS: Yeah, it didn't really bother me, and same at McGill. There were five girls and 100 guys, so 5%. At MIT, I guess it was even smaller percentages. It doesn't usually bother me but you know it became — you sort of become more aware as you get older about some of these situations. I remember when I

landed at MIT, people said, oh, you know. They started warning me about all the troubles about women in STEM or in science and engineering, and I didn't really know what they were talking about.

I think sometimes now, when I talk to young women, I don't always want to tell them about a lot of the problems because if they don't see them, that's fine — to me. Then as they slowly start to see them, then, yeah, you want to let them know that it's normal, that you're not just imagining things. Right?

Let's say at George Washington, there weren't that many other women. There was one woman, and she wasn't treated very well in another department. She was made to leave. It was stressful; a lot of older conservative men.

One funny episode is when I got pregnant. I had decided to work on my teaching and get a grant and get established for three years. Then once I got all that, I said, OK, now I'm going to have a baby, and when I got pregnant, they had this little handbook for employees. I was looking through to see what there would be for maternity, and it just said — I couldn't find it. I was flipping through, and finally I find it, and it says "See disability." So, I turned to the page for disability, and it says you can get two weeks off if you have a doctor's note.

STEGER: Wow.

MAVRIPLIS: It was pathetic. You know, they never had women have babies in engineering. They didn't know. The other two ladies were women who had had their kids first and then gotten their PhDs and then come, so the ice hadn't been broken by anybody, except me. So that was a challenge because then they didn't — so in those days, a lot of schools did not really have a lot written down in terms of procedures for tenure and promotion. I don't know if you know what tenure is, but after seven years, you have to prove that you're worthy of staying on for the rest of your life. You have to have publications, students trained, and your teaching has to be good, and your well, your research dollars — you have to have been able to raise funds.

So, yeah, there's very little written down. So, it was a lot of room for political maneuvering, which is not good, especially if you're the only woman there. So, I was a little worried. I was quite worried about my tenure. But about this maternity thing, and that's the decision too, whether you have the kids before tenure or after tenure. A lot of women wait till after tenure, and then a lot of them have trouble getting pregnant then. And it's just this whole

slew of other problems. My attitude was, I'm going to have kids. I'm not going to wait. I'm not going to sacrifice that just to — just for my career. But I did at least get it established within the first few years. I was also young, which is an advantage.

So, I was going to say about the — because there's no procedures, they didn't know what to do with me being pregnant. So, what I ended up doing is having all my kids in the summer because we have nine-month salaries, as profs. And then in summer, you're supposed to find funds to pay yourself through research grants. So, I just did not use my research grants in the summer so that I could have some time off after having a baby. But not everybody can do that. You can't always plan when you get pregnant, and one pregnancy was in June, one was in July, and one was in August. Well, as the other one that got closer to the September date, what are you going to do? Because you have to teach class, and I was treated very badly when I came back from the first baby.

Then I was told, “Well, you just have to find somebody to replace you.” And then — so then I had to ask a favor to another professor. And then I have to pay that favor back, right? On top of everything else that I'm trying to catch up and, you know, having a new baby and trying to find daycare and you're far from your parents and your regular network. It was quite challenging, I have to say.

STEGER: How did you manage your work-life balance, including childcare?

MAVRIPLIS: Childcare, I found extremely stressful to find somebody. I ended up taking my kids to in-home daycares. There was no daycare on campus. I was on a committee which was trying to work towards getting daycare. It was expensive, a lot of driving around, having to leave at a certain time because daycare people don't want to work past a certain time.

Then, I had three kids while I was there. I had a fourth kid right when I was leaving. So often, yeah, that's the other thing, in Canada it would be easier, I think, to take your kids to the same daycare. Whereas there, I had to often drive in three different directions for all three kids and then get to work. It's quite tiring. But you make it work. I can't think of the rest of what you asked me.

STEGER: Just work-life balance in general, how you managed.

MAVRIPLIS: Oh, work-life balance. Right. I'd have to say, having kids is really good because then I had to stop working at 4 or 5 o'clock, right? Before I would work long hours, weekends, everything. I was used to the MIT model, where you worked all the time. It was crazy. Then I was forced to call it stop at some time, so I eliminated a lot of work that was really not very productive. And it was — I became much more productive, so I think that was a good thing.

STEGER: Did you find issues?

MAVRIPLIS: Yes. I was treated, you know, like when I was pregnant with the fourth kid, I got yelled at. It's like, do you know where these babies are coming from? From a guy, you know. What a comment. Ridiculous.

STEGER: Did you find the issues with work-life balance and pay equity, like you had mentioned with the Boeing offer, pervasive in Canada as well or not as much in the US?

MAVRIPLIS: It's hard to say because now I'm coming at a later time. So, things have gotten better, I think, in the US. But still, a lot of places don't have very good maternity leave. I was at NYU before the pandemic, and I was asking a prof there about maternity leave. She said, oh, it's really good. We have six weeks. And I thought, well, six weeks, not very much.

In Canada, we have a national program. So, it's linked to your unemployment, and you get a year off, and everybody gets it. It's automatic. It's clear that you're not even allowed to work during that year, and departments schedule who's going to replace you. That's the way it should have been when I was there, not me having to run around trying to find somebody to do me a favor. Yeah, it's much better managed now.

I'd say in the States it's better than it was when I was there, but it's still not as good as Canada. And Canada is not as good as some of the Scandinavian countries. Work in progress everywhere.

STEGER: I saw that you also worked with the National Science Foundation and NASA Langley. What was that like?

MAVRIPLIS: The National Science Foundation was great because I was in Washington. We were near the NSF, and I often got called over to be on panels if a panelist didn't show up. So, other researchers come to review proposals. And if there's a panel, then it's in person, 10, 12 people in the room. That was great

for me. I learned so much about writing a good proposal. So, that was a big advantage for me. I was always successful in my proposals from then on.

Then, a few years later, they asked me if I wanted to join them, this time in mathematics. I was working in engineering, but they invited me in mathematics. So again, I liked this back and forth between the two. The first time they asked me, I wasn't so keen. It didn't look so interesting. But then, there was a new director the second time around a couple of years later. The guy had a lot more vision and wanted to change things. Then I was enticed, and I went there for two years.

Again, I had a bit of a problem with my department. They didn't want me to go because they wanted me to write this accreditation report. And they said, oh, you're the only one who can do it. The subtext was because you're a woman. So, that was not good. I ended up working both jobs for a while, which was too much — plus the kids.

But then the second year — most of these rotations, the National Science Foundation, are two years. And the second year, I finally managed to cut most of my ties, not completely, because I had graduate students, and just work the job at NSF. It was a lot of fun because you get a bird's eye view of the research across the country in the field.

I was in applied and computational mathematics, and one part was fluids, which I do, but another part was materials, which I don't do, and some computer stuff. And then there were a lot of cross-cutting programs. At the time, nanotechnology was pretty new. So, I got involved in that and then I got involved with this advanced program for advancing women in academia. So, I got to do a lot of work with other people.

So, my whole career, I like to not just be in one little discipline, but I liked to work with people across disciplines. So that was great for me. You asked about NASA Langley. I went there. I think you could go as a professor in the summer to some of these places. My brother worked at NASA Langley, so I had a good idea about it. My professors and my postdoc advisor also, I think, were quite involved in an institute there. It's called the Institute for Computer Applications, Science, and Engineering — ICASE. And a lot of very famous people from all over the world, mathematicians and engineers, would come there. So, it was perfect for me to do my research there for a summer.

STEGER: After all of these impressive experiences, you ended up at the University of Ottawa under the mechanical engineering department. How did you get there?

MAVRIPLIS: Well, there's one more stop, and that's when my husband wanted to start a rocket company. So, he got some funding, after many years of trying, to go set up in Oklahoma. So, I actually left my professor position, which is not easy, after you get tenure. And with the four kids and my husband, moved to Oklahoma. And he was doing his rocket company, and I was trying to figure out how I was going to work. Although, my daughter was just born, so it was easier to have a bit of time off.

But I wanted to keep going with my research and my projects with Shelly Heller on advancing women. So, we still had some grants that were active. So, I managed to get a couple of grants there, one in meteorology because it's tornado alley, so applying my numerical methods to weather prediction and continue the old grants, and a new grant for advancing women through NSF Advance. So, I got to do those things in Oklahoma, but I was not a professor there, I was a researcher.

And then, my husband's company's funding ended after five years. And then, we had to find jobs again. I couldn't have gone back to my university in Washington, but maybe I could have gone back to the science foundation, National Science Foundation. Or I had an offer at Northwestern and an offer here in Ottawa. And home is Montreal, so I was almost all the way home. So that was a good time to do that.

And then my kids — one of my kids was going to high school, and the prospect of sending four kids to university in the States is quite expensive. It's a lot cheaper here. So, we decided to come home, for me, (my husband is American), so for me it was a good thing.

STEGER: You mentioned NSF Advance, and I know you've been involved in a lot of other initiatives to get women involved in STEM. Can you talk about how you became the NSERC chair for Women in Science and Engineering for Ontario?

MAVRIPLIS: Yeah. So, because I had — we'd had four NSF grants, and we even had one before Advance even was a program, we had a very large grant at George Washington, with Gallaudet University for the Deaf to advance women, mainly from undergraduate to graduate. And then the next ones were more from graduate to professor.

Because I had all that experience when I came, and I knew we had these chair programs in Canada — but I had to wait until they became available because there's only five in the country and one in each region, one in each of five regions — I had my eye on it as a possibility. And so, when it opened up, I wrote a proposal. Having a lot of experience, it was good. But I needed industrial matching funds and that was not super easy either, a significant amount of money.

But Pratt & Whitney, again aerospace — Pratt & Whitney aircraft engines, I had done some work for them setting up a women's leadership forum a couple of years before. So then, I proposed to them that they would do the chair, and they did take it on. So that was great. And then I did that for five years. And then, I renewed for another five years with other funding, this time from CAE [Canadian manufacturer of aircraft simulation and training devices]. It was aircraft simulators, and Lockheed Martin, and a private foundation.

So that's super nice, because the work we did in the States, although it was recognized with an NSF grant, it was always considered not serious work, right? So, you should be doing your engineering work, and this sort of stuff we did on the weekend at first. But now, if I have a chair, it's like — it's a recognized position. It's the funding from the same funding agency as you would get for other type of research, scientific research. And you were mandated to do 50% of your time on advancing women and 50% on your other stuff.

It brings a lot of visibility; a lot of people call you up. I'm in Ottawa. I'm in the capital. So, a lot of the ministers of Parliament will call you for advice or to have some input on policy. So that was really nice. I've had 10 years of doing that and I still do the work now. I don't have the chair anymore, but still trying to find support to continue.

STEGER: It seems like it was a much more recognized position in Canada than it was in the US, that type of work?

MAVRIPLIS: Yeah. For sure.

STEGER: Would you like to speak a little bit more about the FORWARD to Graduate School and FORWARD to Professorship programs you brought to Canada?

MAVRIPLIS: Yes. The FORWARD to Graduate School, I mentioned before that I got together with Shelly Heller. And so, we looked for another university to

partner with. And we met — I forget how we met, but Charlene Sorensen, a professor of chemistry at Gallaudet [University], and Dave Snyder, a professor of physics [at Gallaudet University].

So, we got together and wrote this proposal. And we had to involve four other schools. So, we involved Smith College for women, and a historically Black college and university, Hampton University in Hampton, Virginia, near NASA Langley, and I think Hood College in Western Maryland, and the National Technical Institute for the Deaf in Rochester, New York. And so really, because of the deaf aspect of Gallaudet and NTID and the women's college and then George Washington, we had really quite a nice program. And we did many things. We did five different things. But the FORWARD to Graduate School was probably the one that had a nice model to it.

So, we were helping students just consider graduate school. None of these workshops are particularly women-focused, although we invited mostly women and other underrepresented groups. Men could come if they want. So, it wasn't like a bunch of women complaining. It was more just giving them information that's hard to find, if you're not in the mainstream.

Deaf students, particularly, have a lot of communication problems. They don't get the same information we get. People were not used to having a deaf person around doing technical work. So, we worked on, for instance, sign language, ASL for technical terms. That wasn't my part, but the professors at Gallaudet were working on that. They had trouble with the GREs, Graduate Record Exams. So, they had a lot of training. I mean, we gave training to everybody, but more training to them because their grammar is different than ours and things like that. So, it was really quite an interesting project.

We would do every semester one of these sort of weekend workshops. As I mentioned, it was always on the weekend. But we got a lot of girls to think about going to graduate school who wouldn't have gone otherwise. Some of them came back year after year, earned their PhDs and became professors. We had one student, Susan Chin, in particular, who's deaf, and she got her master's in environmental engineering, so that was kind of cool.

And then, when the new proposal — or request for proposals came out with the Advance program, we said, oh, well let's just ratchet this up to the next level. So, we were kind of working through the pipeline and blocking those, you know, what they used to call the leaky pipeline of women in STEM.

So, the next level up was, oh, why don't we go from FORWARD to Graduate School to FORWARD to Professorship. And so again, nothing particularly about women, other than the work-life balance part. It was about how to write proposals, and that I had learned from being next to NSF and being on those panels and working there. So, how to write proposals, how to find funding, how to set up a lab, how to train graduate students, how to deal with applying for a professor position, how to negotiate an offer, negotiation training, communication training, interacting with administrators. So, that was very popular. We ran it every year in Washington as a national workshop. It was oversold.

And then in 2005, we ran it at MIT with Blanche Staton, who's — I can't remember her exact title in the graduate school. [Blanche Staton; Senior Associate Dean and Director in the Office of Graduate Education.] And she loved it, and she involved graduate students to help run it. And then, they learned how to run it themselves. So now it's called Path to Professorship at MIT. It's run every year since. So that's a long time, 18 years.

So, yeah, a lot of people will benefit from that. It's nice to see. A lot of women would come and say, “Oh, I have a PhD in environmental toxicology, but I don't I don't know if I could become a professor. I think I'd like to become a science writer. I'll just work for Nature.” And always the word "just" was in there. I'd wonder, “Why would you do that to yourself after studying all this stuff?” They would respond, “Oh well, I don't know if I can handle it.” I was like, “Of course you can handle it.”

So, we'd put them through the steps or help them. And the other thing is to realize that, if you come from MIT or Princeton or Berkeley or Caltech, those are not the only schools in the world. There's such a range of universities in — just in the US. Plus, you can go anywhere else in the world, right?

So, we'd bring people from smaller schools, from mid-sized schools, state schools, private schools, top-tier schools, to give them the understanding that there's a wide, wide range here because when you're with a professor at MIT, they usually say, well, you're not going to go to Stanford or Caltech, you know, forget it, because that's their world. But it's not everybody's world.

STEGER: Talking about your chairmanship in general, are there any accomplishments that you're particularly proud of or any major challenges you'd like to talk about?

MAVRIPLIS: What happened with the FORWARD to Professorship after the MIT part is we had to write another grant if we wanted to continue, and you can't just get money for the same thing every time, so we had to keep inventing new stuff. So, we trained 10 other teams beyond MIT to develop their own workshops based on either a field of science or engineering, in particular, or a cultural aspect or a geographical aspect. So, that was very interesting.

We had a workshop in Guam with Pacific Islander women, with all the culture, as one of the professors put it, women with swaying grass skirts, the image of that. How do you marry that with women who want to become professors? And then all the way to New York City, where we had — it was more of a regional workshop for women in computer science and math, who wanted to become professors. And in the Midwest, it was one for women of color in the Midwest, in a very white part of the Midwest.

So, it was great to see that we could adapt it in different ways. And we wrote a book together, *FORWARD to Professorship in STEM: Inclusive Faculty Development Strategies That Work* (Academic Press, 2016), which was nice. So, each chapter is a different version of the workshop. I'm very proud of that book. I have it out there as a record because a lot of stuff women do doesn't get recorded in history. So, at least we have some kind of lasting product there. And that was a nice project.

The workshop now is across the US in different versions. I've done it across Canada. I ran it in Switzerland this summer. And I'd like to run more in other parts of Europe because in Europe, again, it's quite conservative. And in Germany, it's quite hard to get a professor position. There are fewer positions, and it's more hierarchical in structure. So still, stuff can be done.

Otherwise, I did a coding outreach activity for girls, when there were none, many years ago. And, that has been spread across Canada in every province, so that's nice.

With the company, with Pratt & Whitney, I was really glad to get with women in industry, rather than always academics, and understand their paths to career advancement or leadership. And, that was satisfying, I'd have to say. I love networking with smart women everywhere, no matter where

they are. So, I guess the best part for me is meeting all these very smart women and having a very wide network and feeling like you can support them in ways that I wasn't supported and help them and move forward and create new things.

So, like the workshop, when we first ran it, we were organizing most of the activities. But as we went along, the women started becoming their own organizers. And they were — like they didn't need us anymore, right. So, this is nice. You always see some women emerge as the strong leaders in the group.

STEGER: You have a bunch of other titles in addition to that chair. You're also the President of the Computational Fluid Dynamics Society of Canada and a Councilor of the Canadian Aeronautics and Space Institute. Would you like to share anything about either of those experiences?

MAVRIPLIS: Yep. Those were good. I think I'm the only woman president of that society. But there was no — very congenial bunch — there were no major issues there. I didn't really want to take it on, I have to say. Sometimes, I don't like to be in the limelight, but it's kind of like the other NSF job. Somebody asked me to do it, and I said no. And then — and then a couple of years later, they were like, come on, you've got to do it. And they tried to convince me, and I was like, OK. So, I did that.

And then the other one, the Aeronautics and Space Institute, is an organization my dad was part of. When I was young, I remember going to some of the social functions because my dad was getting these awards. So, it was kind of weird being in the same organization that he was. It was a bit closer to industry. And, in all of these we organize a lot of conferences, so I run a lot because I ran all those workshops for women. I have run a lot of conferences, and that's fun too.

Again, I think in the end, it's all about the people and getting people together to advance whatever it is you want to advance — science or careers. I get a lot of satisfaction from it.

STEGER: So just to close the interview off, what are you working on now?

MAVRIPLIS: I'm working on trying to find funding to continue the work for women. It's not easy. A lot of companies say they want to do something about women, but now it's more equity, diversity, inclusion, not so much women alone. But they say they want to do something, but they don't really know what. So, we

try to offer them ideas. I don't know, it's not clear always if it's a yes or a no. Sometimes it's a yes all of a sudden, and it's exciting. And other times, you have to keep offering different things.

Things have evolved a lot. There's a lot of activities out there. So, Ladies Learning Code, I think they renamed themselves lately to some other name. But, there's a lot of organizations out there. So, you have to always stay ahead and think of what's next.

I'm very interested in leadership development. I taught a course on leadership development in science and engineering. I would like to teach it again, but again, it's not on the list of regular courses. It's not in the accreditation process. Everybody's busy, and there's budget cuts. So, there are times when things you want to do are easier and other times when they're not so easy. And so, when I had the chair, I had my own budget, so I could do some of these things. Now I don't.

But on the other hand, I can go to other things we have. I'd like to get one of these big grants for interdisciplinary training of graduate students. We had one. It just ended, so I'd like to do another one. So, anything interdisciplinary working with other people would be nice. And, I want to continue my own — I haven't talked about it much, but I have all my fluid dynamics research that I'd like to continue. And, I would love to have something really useful put on an airplane someday. So, some of my research is too detailed or too expensive computationally for aircraft industry. But we're starting to get closer.

So, it would be nice to see that on an airplane. I'm a bit envious of my dad, in some way, you know, he actually got to build an aircraft. There's a whole slew of aircrafts that have been very successful. So, the Airbus 220 is a derivative of all the aircrafts he worked on. It was a Bombardier C-series aircraft, but it ended up being sold to Airbus because of financial difficulties. So, not a great story, but a beautiful aircraft. So, it's nice when I fly on it. It's kind of nice.

STEGER: Is there anything else you'd like to add from anything we've discussed today? So, your early life, time at MIT, personal life, current work.

MAVRIPLIS: No, I think it's good.

STEGER: OK. Well, thank you so much for doing this interview. It was really great to get to know you, hear more about your story through your perspective.

Please let me know if you have any questions. And thank you again. It was really great to hear about your experience.

MAVRIPLIS: Thank you, Olivia.