

LASEWICZ: This is an oral history interview with Frances, IBM Product Development. And it's being conducted on August 5, 2003, by IBM Corporate Archivist, Paul Lasewicz. Welcome.

FRANCES: Thank you very much.

LASEWICZ: Okay, I think we'll start talking about your career, professional background a little bit. Can you tell me what your field of study is? And why you chose this field to work in?

FRANCES: I have a Bachelors degree in physics from the University of Bristol, England and a Masters in physics from the University of Vermont. I chose physics because I wanted a broad background to be able to work in a variety of engineering fields.

LASEWICZ: It's interesting that you say broad --why did you term it broad?

FRANCES: When I was thinking about engineering, what I thought I wanted to do, was aeronautical engineering. But, aeronautical engineering seemed to me very narrow.

I was a little hesitant about being labeled an aeronautical engineer and then not being able to move into some other

kind of engineering. So, I felt that physics would enable me to move around a little bit easier.

LASEWICZ: Can you describe your early experiences with science and technology?

FRANCES: Sure. I was born in England, grew up there, and was educated there. They start teaching physics very early. I had my first physics lesson when I was 13 or 14. The curriculum there is set up to prepare students for formal exams at age 16.

So, I had studied physics quite early and loved it from the very beginning. It suited me very well. I remember one of the first physics classes was experimenting with electronic circuits.

We had to draw little circuit diagrams. I wasn't a very good artist, but I could manage drawing batteries using two parallel straight lines, and a resistor as a zigzagged line. You can use a ruler, and there's not a lot of artistic interpretation to what you're drawing. [LAUGHTER]

It was taught very formally, I guess, when I was in school. But there was structure to it. And it just appealed to me.

I wasn't very verbose in my essays normally in English or history. I like to stick the facts and a short abstract, introduction and method of what I did followed by a conclusion was very appealing to me.

LASEWICZ: Sounds like good reasons. At some point, did you start off with business being the science, did you always target engineering from the business side or did you reach a eureka moment when you said, you know, I can be an engineer, I would like to be an engineer?

FRANCES: I did, actually. I was in my junior year of high school. And one of my teachers mentioned that there was an engineering course, a residential course that was being held for one week in the summer.

It was for women who were interested, or girls, I suppose, interested in studying engineering at school. I'd always been thinking of physics, but my teacher suggested I apply for this course.

The course was at Brunel University, which is outside of London. It was a one-week residential course. There were about 50 girls that were there. It was after the school year was out for the college students, so we were staying in the dorms.

We were set up into groups to work on specific projects and during the week we would be lectured to by the professors at the university. One of the projects we were asked to do for the length of the week was to build a train or vehicle out of Lego that was to follow a white track along the floor.

We were able to play with the gearing, and use a small light sensitive detector to follow the piece of white tape. The train had to carry ping-pong balls and then unload them at the end.

Anyway. This was an enjoyable project. We actually ended up winning the competition. I can't remember the criteria, shortest time or most ping-pong balls delivered or something.

Part of this course was to spend a day in industry. The company that I went to was called [Picker International].

I hadn't actually heard of [Picker International] before I went. It turns out that they make MRIs and medical diagnostic equipment and CAT scans and things like that.

We were being shown around the labs and the prototype MRIs. The engineer was telling us about funny things that happen with big magnets and showing us some diagnostic images that

you could see on the monitor. It was a cross section of the brain we were looking at.

I thought, this is really good. This is great. This is absolutely what I want to do. So I asked the engineer what he studied at university.

He said that he studied physics. And I said to myself, if you can study physics and do this, then I'm going to study physics because this is just the kind of thing that I want to do. And that was the turning point. It was a no brainer after that. That was exactly what I wanted to do.

LASEWICZ: That's so cool...

FRANCES: Yes, it was. It was good.

LASEWICZ: Along the way, did anybody provide you encouragement?

FRANCES: Yes, family and teachers were without question just fantastic. It was never an issue to study hard, difficult subjects that women don't normally do. My goals when I was growing up were to be an airline pilot, and then I wanted to be an astronaut.

And no one ever said, "Oh, girls can't do that." That never even crossed my mind. I was very lucky in that regard.

LASEWICZ: You talk about your background a little bit, now you're a working professional in the field. Has it turned out to be what you expected or how you were led to believe it would be through your studies?

FRANCES: A little different. I'm not sure I had a clear picture of what it was going to be, but I have a few things that strike me as things I wouldn't have expected -- for example, the teamwork that goes on.

You are faced with challenging problems every day but you're never on your own. There's always somebody to bounce ideas off or talk to and you're not expected to solve every single problem on your own.

I've been lucky to be surrounded by great colleagues who are very knowledgeable and helpful. And we always get it done.

LASEWICZ: Are there things that students could do to do to help prepare them for that aspect of their [working life]?

FRANCES: Teamwork is a very important aspect. It's a hard thing to teach or to get students to understand that

you need to be independent and be able to work on your own. But there aren't enough hours in the day for you to do it all on your own.

One of the things I remember thinking when I was younger was how can you possibly work on the same project for years? It seemed like such a long time.

But the tasks that you have to do can be broken down into small pieces. You're tackling a portion of it on your own, but within a larger group. When you look at the grander scheme, the number of people that it takes to work on a project is huge.

I think it's good for colleges to make sure that that aspect is covered. And for students to take pleasure in learning from other people.

LASEWICZ: Have you had mentors in the course of your career? And if so, what are the good qualities that you found in your mentor?

FRANCES: I have. I think I've been lucky throughout my life to have good mentors whether they were official or just people that took an interest in me or teachers that said an encouraging word here and there.

I have two mentors now. Both of them I consider incredibly technically competent and each have achieved high standing in that regard, which is important to me.

But they also have a good work/life balance, which is good for me too. To learn how they deal with in one case a husband, in the other case a wife, at home and with children and so forth.

With one of my mentors we mainly discuss aspects related to working at IBM. The work/life balance issues and what it takes to be a good leader and a good manager.

My other mentor was in management for a while and stepped out and wanted to continue on as a technical lead. He's an STSM (Senior Technical Staff Member) now. I've had the pleasure of working with him quite regularly because we work in sister departments.

I look to him more to guide me on specific things. What specifically was good or not good about some analysis that I did. And that's helpful as well.

LASEWICZ: You've raised the issue of work/life balance. How has that posed a challenge for you?

FRANCES: Yes. It is a challenge. Part of it is because I find my job very interesting. You can always do more analysis and there's always another way to look at things.

It can be hard to stop sometimes. I need to get back on to that track of being disciplined and taking care of the job during working hours instead of assuming that I will just continue at home.

The mentor relationship that we have I think does help a lot. Seeing colleagues that are obviously exceeding at their jobs who go home and play with their children and have great work/life balances.

LASEWICZ: I'd like to return to talking about your job. Can you describe the kinds of things that you're doing on a daily basis or have done in the past?

FRANCES: Sure. My first job out of graduate school was a Hewlett Packard in Massachusetts. I worked in their medical products group where we designed and manufactured medical ultrasound systems.

I was responsible for the acoustic output regulations side of the ultrasound systems that we built. That was a great experience for me. I did that for four years before moving to IBM.

At IBM, I'm a product engineer. We design and manufacture PowerPC microprocessors that are sold to companies like Apple Computer and used in Nintendo's Game Cube.

I'm in product development working between the technologists in the ASTC in Fishkill, and manufacturing in Burlington, bringing those two together making sure that the products that are being built and the technology that is being used are going to meet our customers' requirements.

After the technology has been qualified, we bring the technology into a product in the microprocessor arena. Specifically, I do a lot of data analysis and characterization, looking at the data being taken in the line as the [wafers] are being built and tested.

And then trying to correlate that to the specific performance requirements of the microprocessors. Primarily speed and power. How fast is it? How can we make it faster? How can we make the power lower so that if it's going into a laptop, the battery lasts for the length of a DVD. That kind of thing.

Correlating the results from testing the microprocessor in an actual system all the way back through its testing during production to a finished wafer, a diced wafer into a module.

Bringing all of those pieces of information together. Fun, huh? [LAUGHTER]

LASEWICZ: It sounds like you're juggling a lot of things there. The classroom technical training you've received, how well is that translated to the working world and how much of it do you use in your day-to-day job?

FRANCES: I think of university as covering two aspects. There's the course material, the classes taken and the knowledge gained. And then there are the skills that you learn on the way, problem-solving skills, team-building skills.

Bristol University was very much into lab work. Degrees in England are normally three years or at least they were when I was there just doing physics. We had eight hours of labs the first year, 13 hours of labs the second year and expected to be in lab for two and a half days in the final year, working on a project.

You and your lab partner are working on a project for a whole year, learning new techniques on the way.

But, it's the discipline and perseverance that you learn, and the sense of accomplishment when you finish. Part of

that accomplishment is remembered when starting a job and thinking, I have a physics degree, I can do this new thing.

You might not have studied that particular thing or learned this little aspect. But it allows you to tackle it and not be intimidated.

Unfortunately, you don't see many jobs for physicists. You see jobs for engineering: electrical engineering, mechanical engineering, and chemical engineering.

And while in your heart of hearts perhaps you know you can do these things, maybe there's a little piece of you that is saying, "Well, I don't know what they've learned, I don't know whether I can design a circuit as well as someone that went into EE."

And that was hard. Marketing myself after finishing school. Being confident about applying for careers that asked for an engineering degree. I wouldn't have changed physics. I would do it again in a heartbeat.

But I would advise students to try and get into a program that had some kind of training or job coop arrangement with a company so that not only can you prove to yourself that

yes, I can do that, but you can write it on your resume as something that you've done.

LASEWICZ: What do you find most satisfying about your work?

FRANCES: For me, I'm a big picture person. I love working on new technologies. I like seeing our customers thrilled with our products so that can do things that they couldn't do before.

They can improve Photoshop or some other application. And that to me is exciting. Also to see my customers' products in the hands of my friends or neighbors. That's thrilling to me.

Every new project is a little bit more difficult than the last one. The technology is always getting more and more challenging. There's always something you need to learn.

I also try to think of how can I make this better or easier for the next person? When I'm training a new engineer, I try to stress that continuous improvement is not an added thing that you do, it's 10, 20 percent of your job. I don't consider that you're doing your job unless you're making it better for the next person.

I think that it's good not just for the team to keep our tools and methods current, but also good for the individual as well. There are lots of opportunities to make things better.

The Web is very useful and it can be a good thing to write down as a skill. For example, you didn't have to make a website, but maybe you've made it easier for yourself, probably the next person and probably all the people on your team.

LASEWICZ: And possibly create a growth opportunity.

FRANCES: Yes, right.

LASEWICZ: Is that something that you expected from your [schooling], this atmosphere of continuous learning?

FRANCES: I'm not sure I had thought about it, but I wouldn't want it any other way. It's not like it has to be separate from your job. You can tie it easily into your work. I think it makes your job more interesting.

LASEWICZ: What are some of the ways that you can participate in this ongoing learning process? You mentioned one perhaps picking up skills in an area that you didn't

have skills before, so you can tackle a project like a Web page to teach yourself like that. Are there other channels that you [find in] your organization that can help you do this?

FRANCES: We have classes on site that are run by IBM. We would suggest that a new employee in my department sit in on a device physics class. And we have those.

We also do a lot of programming and there are data analysis classes that are run by IBM onsite which are always good to brush up on SAS programming or something.

There is also an affiliation with University of Vermont and courses that you can take at UVM or courses onsite from the university. NTU, the National Technical University, also has videos or video feeds from classes that are all over the country. A lot of people take those up.

LASEWICZ: During the course of your academic and professional career, have you faced any challenges? And if so, how did you overcome them or what do you consider to be your greatest challenges?

FRANCES: I think one would be talking in front of large groups. When I had just started at Hewlett Packard, I'd been there for about five months or so and my manager asked

whether I'd like to participate in a series of committee meetings that were held by AIUM which is the American Institute of Ultrasound Medicine.

And so I said, "Yes, I would love to do this." There were a couple of committees that of particular relevance to my job, technical standards committee and bioeffects committee.

So, this was my first trip, and it was being held in Las Vegas. So I went out to Las Vegas, I was on my own. I wasn't expecting to know everybody and I didn't know anybody.

I had spoken with HP employees that have been on these committees in the past, so I knew what to expect and who would be there and so on. The room was filled with professors and scientists, clinicians and physicians and also engineers from other companies. HP's competitors.

I was extremely nervous about saying something stupid or saying something that was HP confidential, giving away some HP secret.

We were sitting in a very big conference room. And I had positioned myself somewhat to the center of the room thinking, at least I won't have to shout very loudly to be heard. People are often thrown with my accent at first. It

takes them a while to get used to it and I know I don't speak very loudly.

Everyone sat down and the chair suggested that we go around the room and state our name and affiliation for the minutes. It came to my turn and for some reason I said my maiden name instead of my married name and then corrected myself explaining that I had just got married -- everyone laughed, luckily. I was so embarrassed. And all I could think was, okay, fine, nothing can be any worse than that.

So, the meeting went on I learned a couple of things from that experience about speaking in front of people. If there is a teleconference, I make sure that I'm sitting close to the phone. If we're in a big meeting room I make sure that I'm sitting near the front. So if I do want to say something, I can be at least close to possibly a microphone or at least the person that needs to hear my question.

I continued going to these meetings and I probably didn't say a whole lot, but I had written a few papers on bioeffect issues and so when I did have something to say, I spoke up. But I mostly listened. The people that were there were fantastic, very knowledgeable people, had been in the industry for decades.

Just before I left HP to come to IBM, they were taking nominations for members to their technical standards committee. And to my surprise, one of the professors nominated me or put my name forward.

And was completely surprised. I thought that just to be considered that I would be able to make a contribution to this group was an honor for me. I took away from that, that it's okay not to know everything. You're not expected to know everything.

I had been the new kid on the block and I had a lot to learn. Take advantage of the people that are around you. They had so much more experience than me and I learned an awful lot from them.

Also, when you do something, do it well because people around you will notice. When you're ready to take on a new responsibility you never know when you're going to be asked to step up to the plate. I had left HP then, but it still meant a lot to me to be nominated to this committee.

LASEWICZ: It's nice validation.

FRANCES: It was. It was very nice.

LASEWICZ: Do you still participate in professional organizations?

FRANCES: Not so much now. I'd like to, but I haven't since I sort of joined IBM. Just been working on the problems at hand.

LASEWICZ: It's part of that work/life balance.

FRANCES: Right.

LASEWICZ: Is there anything that you'd like to add that perhaps we haven't talked about, that I haven't asked you about or do you have some additional insights that you'd like to impart?

FRANCES: One thing that I would like to mention. It's along the lines of discipline and things that you can learn from studying at school. Going through school and taking on other responsibilities through school.

When I was in college, I played the French horn and I continue to do that now. But my final year, where I had more rehearsals than I had in my previous three years, was by far the best year academically for me.

I think a lot of it was to do with time management and really focusing on the things that I needed to get done in order to pass an exam or hand in some homework. And not thinking that, oh, I have all night, I can just procrastinate and watch the television.

I had to do it in the next hour and a half because I had to get to rehearsal. My grades were much better that year. Four years is a long time at university and there's time to do other stuff and it can be helpful as a way to focus.

LASEWICZ: Normally, you don't think of taking on additional responsibilities a way of creating discipline

FRANCES: Yes.

LASEWICZ: That's right, you would have to organize a day very specifically.

FRANCES: But I truly believe that it was. I remember my first year I would sit in my dorm room, and just work. Work, work, work.

But didn't help because it wasn't focused. It wasn't working on the right thing, it wasn't working on the thing that I needed to learn. It was just sitting, looking at books. It wasn't directed or efficient.

LASEWICZ: Well, that's it then FRANCES: Well, thank you very much.

FRANCES: Thank you. It's been a pleasure.

[END OF INTERVIEW]