This is an oral history interview with Dr. Josephine Cheng, IBM Fellow on July 31, 2003, by IBM Corporate Archivist, Paul Lasewicz. Welcome and thank you for joining us.

CHENG: Thank you.

LASEWICZ: I'd like to start off by talking about your current position and title. Can you tell me what that is and tell me what you do?

CHENG: I'm an IBM Fellow. I'm also a manager in data management responsible for the advanced technologies related to pervasive computing and embedded database.

LASEWICZ: Can you give us an example of some of the ways that your responsibilities factor into real life, the real world at this point?

CHENG: Okay. Maybe I should start with some customer examples: We have people using our product called DB2 EveryPlace which consists of a very tiny database, tiny in terms of footprint, that can be put it into devices -- devices like embedded devices or cell phones or PDAs like Palm, Pocket PC.
 So we have a database managing of all your data --… people

So we have a database managing of all your data --… people can write simple questions and query up against the data.

We also have a connectivity piece that's connecting this device to the back end data software so that you can retrieve all the information and do analysis. It is two-way communication.

So, … we have a customer using DB2 EveryPlace for weather recording so that now you can go and say what's the average temperature, you don't have to have someone to record the temperature every five minutes or so.

…We have people putting DB2 EveryPlace in refrigerators, -- no kidding! And then we also have people putting [it] into car telemetrics. And we have people using it for even enterprise application, for sales automation and health, medical health.

And even on the golf course. [At a recent] golf tournament they gave away a Palm so that at any time, you can go and find out what's the score of each player. Where are they playing, what's the score so that you can be up to date at any minute, any time.

 [At] Hong Kong International Airport, they have a device that you can use a fingerprint for identification and can

track cargo and luggage [and identify] where they are and underneath [it] is DB2 EveryPlace.

LASEWICZ: Part of a changing world.

CHENG: Yes. So it's really exciting technology.

LASEWICZ: Can you talk about the school and the education you've had. What courses interested you the most and why?

CHENG: I got my Bachelor's degree in mathematics computer science and also my Master's degree in computer science both at UCLA. I liked every class that I took in college. I enjoy life. College is really the best time.

In particular, I liked the database class. So when I first took the database class which was an introduction of database at undergraduate, and we did a prototype to design a database system for a debit card transaction in a gas station. The one that you see today. You know, you can buy off the credit card, pay for it. And so we did that 29 years ago as a prototype in school.

So it's really exciting that we designed the whole system, the language interface, the security, the recoverability, designing the entire system. And I loved

it so much, that's why I went back to graduate school specializing in database.

LASEWICZ: And have you been in databases ever since? This is your field?

CHENG: Yes, so then I joined IBM -- I worked in DB2. At that time it was still a prototype so it was not called DB2, it was called Eagle.   So I worked on the Eagle project, a prototype.

And then later on, it became DB2 database and a very successful product.   We have almost all of Fortune 500 customers using DB2.

LASEWICZ: Can you give me a summary of your work history? You joined IBM in.?

CHENG: I graduated from UCLA in 1977.   [Right out of school]…I joined IBM. And at that time, Santa Teresa Lab, now it is called Silicon Valley Lab, was first opened in 1977.   So I was the first one to join [the Lab].   Actually we had 12 of us that joined that same year as new graduates.

And we were put into a new training program where we were trained …[on] programming. We also had rotation assignments

to go and work on different projects for half a year. And then I joined the Eagle project in 1977.

When I first started, I started at the lowest level. At the time it was called associate programmer.   I worked with a chief programmer. And then after a couple of years I moved into another component in the database. And then I think after that... I worked on optimization.

The first project I worked on, the buffer manager, for a couple of years.   Then I worked on the optimizer for a couple of years. And then I become the team leader leading the whole relational data system department and proposing some of the new ways that we should go … rewriting the code to make it more efficient.

So, I worked in the development for quite a while, eight years, eight to 10 years in DB2 development. And then I switched to work with research and forming the Database Technology Institute with Pat Selinger as the director for the Database Technology Institute.   I was the first employee from the Santa Teresa [lab] to join the Database Technology Institute.

The objective was to work together with development and research so that we can speed up the technology deployment

rather than research it and then do development and implement it -- that takes too long. So [instead] we will go and work on the area from the beginning, conceive the idea, implementation and delivery. It worked out very well, very good partnership and also I got a lot of chances to work with all the scientists in computer science in database area.

During that [time at the] Database Technology Institute, (I'm still in the Database Technology Institute even today)… I also got a chance to go to work on technical marketing as a really short-term assignment. Because at that time China had opened up -- that lots of businesses in China -- but there were not that many skills, you know, people skills. And so I took an assignment to go to Hong Kong and teach all the software engineers at that time, we call software engineers, teaching them how to use DB2 and how to design applications. It was quite interesting. So I took my assignment there for a couple of months working with customers a lot.

And then I came back and continued my work in [the] Database Technology Institute. At that time, I still continued working on some query optimization that can apply to DB2 on the zOS or AS/400 or the DB2 UDB.

And then around 1995 -- by then I'm more concentrated on the leading edge technology related to the database --we were working on the Internet, how do you deploy data into the Internet. How can you generate dynamic Web pages with information changing every time, with that information being stored in a database.

We did have something coming out at the end of 1995, sort of like a prototype, called DB2 World Wide Web. And in 1996, it was really amazing. Everyone is trying to go and push everything into the Internet using us, you know, we were thinking of this as a prototype, but people were using it as a product.

We see Japan Airline was the first one to have online reservations. You can see things online using DB2 World-Wide-Web which is really a prototype, not a product. And then we see the University of San Francisco, the first one who had online registration.

So, everyone pushing things online and saying, this is a great product. So we were asked to go and [make it a product] in 1996. So that was really lots of heavy development work…but it was really fun.

We worked on the Internet technology. Then also initiated the XML, works required some XML extenders so that you can go and store some document and retrieve and query it.

 And also then later on, then we get into the pervasive And also then later on, then we get into the pervasive computing, working on DB2 EveryPlace and the one that I just talked about. About two years ago, I also was responsible for the IBM Cloudscape, which is acquired from the Informix. IBM Cloudscape is really a very nice 100 percent Java database and totally embeddable, very easy to use. So, I'm really excited about that technology.

LASEWICZ: Congratulations. Okay, you talked about your career history, you talked about your academics a little bit. Were there any experiences that you had prior to college that told you that math is what you liked and if so, can you describe them?

CHENG: When I was young, well, I come from a big family and I have three elder brothers and one younger brother, then followed by two sisters. So, in my life, I have lots of boys surrounding me.

And for some reason, boys are really good in math. So, all my older brothers, they're very good in math, physics, science and so when I look at that and say, "Oh, they got

A's in math, they got A's in physics." And I said, "I can do that too."

So, even when I was young and I was always doing good in math because I wanted to be just like them. And it turned out to be really good because it gives me a good foundation to understand. The way that I like math is you really don't have to memorize things, you just have to understand it, then you can apply the principle to other applications and once you understand it, you can solve a lot of other problems.

So, I do like it very much because I don't want to memorize a whole thing like biology, you have to memorize all the terms. History, you have to memorize all of that. So, I do like math simply because you don't have to do much work.

LASEWICZ: Well, that's funny because Pat Selinger said that she chose math because she didn't have to write all the papers in English in college.

CHENG: And then when I was in college, I was not really thinking about going into computer science. It was not really anything when I was young because at that time computers were not really that common. And so when I first went to college, I was thinking [about] going to do

pharmacy or medicine, something like that. But I took
computer science, the first computer science class that I
took. And it was programming in Basic and Basic is a
programming language, very simple programming language.

And we worked with interactive time-sharing machine, the
PDP 10. No one ever knows what it is. And I fell in love
with it because the computer can do all the computations so
fast.
And I really don't have to do all the work. The machine
does the work. All I have to do is just to tell the
machine what to do. And that is exactly what programming
is about. Programming is really writing all of the
instruction to tell the machine what to do.

And so after one year, I got into the school of pharmacy
and school of engineering and it is really an easy choice
that I go into school of engineering in computer science
rather than to pharmacy. But that was never in my mind,
not even when I was young, not even when I went to college.

LASEWICZ: You had talked about the encouragement and the
roles that your family played in supporting your interest
in science and mathematics. Were there any other figures
that you can think of that provided similar encouragement?

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CHENG: Well, in the Chinese family, I come from a Chinese family, the culture is quite different. In the old time in the Chinese family there was more emphasis on boys than girls. So my father always thought that it was very important for boys to go to college. Girls, they don't have to go to college. They probably [will] get married.

But my mom really believed in the education and believed in equal opportunity for boys and girls. So, I think my mom really did give quite [a bit] of support for me to go and pursue my higher degree.

LASEWICZ: Going back to your career at IBM. Did you ever have a mentor and if so, what role did he or she play for you?

CHENG: Yes. I really look at mentors in two ways. There's one type of mentor that I view anyone that I can learn from, then I view them as a mentor.

For example, if I'm listening to someone's speech and I find that speech is really capturing all the attention, I will go and try to learn what is really the reason that someone is giving a good speech. The content, the style. And I do view those people as mentors. You know, anyone that I can learn from, I view them as a mentor.

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So, I really have quite a bit of [experience with] those mentors. They may not necessarily know that they are my mentors, but I do view them as my mentors.

And then the other type is one that I do feel very comfortable with. I feel trust whenever I have a problem, I will come and ask for advice. And so I do have mentors that helped me on some of my questions and helped me in my career and giving advice.

And I think that both of those two types of mentors are important. And certainly, I have many mentors in both of those categories.

LASEWICZ: Are you at a stage in your career where you're serving as a mentor for somebody else?

CHENG: Oh, yes. I have many protégés also. One thing that I tried out last year -- I also [do] group mentoring. And that group mentoring is more open to the public, I was requested by the San Jose Women in Technology as a mentor of a group of technical women.

It's really basic, the mentoring. So I did one on group mentoring. That was really, really good. And now this

year, I modified [it] a little bit and do some one-to-one mentoring, especially for the higher band employees.

And then now I'm also doing some group mentoring, by common interests and also by the common band. So, for example, I have one group mentoring for Band 9 ER (Executive Resource) and I have one group mentoring for Band 9 TR (Technical Resource). So I do have some small group mentoring.

And I started that this year, since everyone liked the concept. So it is still too early to say. So I said, we can change anytime. But so far, people really like the networking within the team. They're all from different organizations and they all have a similar interest, similar types of questions and so they can form a network and we can go and focus on some of the career questions that are coming to all of them. So I hope this way will be more effective mentoring.

So, now I'm thinking about starting something else, have a Band 8 and I'm thinking about a Band 7 one, but I haven't started on the Band 7.

LASEWICZ: Sounds interesting.   Sounds like a good idea. You mentioned that your academic training was in databases almost from the start.

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CHENG: Right.

LASEWICZ: Did that prepare you well for your career in databases? Do you still use the things that you learned in college today?

CHENG: Yes. I think the college did influence me on my interests. So when I came to IBM and when I interviewed, I said I want to work on database. And I was really lucky and fortunate because at that time they started on the database project. And so that definitely helped to go and get the foundation. The way that I feel on the college education is not so much that you learn a particular thing that is most useful. Let me give an example.

One of the lower level division of computer science class at UCLA is programming, and they teach one programming language every one or two weeks. And we have to turn in the programming assignment in that particular language.

Not until I joined IBM did I realize the objective of that class. You know, the objective of the class is not to teach you all of the programming languages that ever need to know. When I came and joined IBM, IBM has its own programming language, PLAS. So they would teach you everything but the way that I think the objective of the class is to make you learn how to adapt to any new programming language. So that today it's Java, tomorrow may

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be a different language. But, not a problem because you know how to adapt, you know to do it very naturally. And so I think the college class is not that I just learned a particular recovery principle in database or a particular query optimization in database.

It's really learning the foundation and how to research and how to apply, how to learn new things from it. That is the skill that I learned from the school that is more applicable to daily life.

LASEWICZ: Can you describe some of the particulars of the work that you've done over the years and what you find most satisfying about it?

CHENG: I think the most satisfying things of all the work that I did is to see the products out of the door and used by the customer. And I mentioned that I have a brief assignment in technical marketing. And that is really eye opening for me as a developer.

And you also can see, you know, because every day I work with customers. And you can see also the feedback right away.

I remember at that time I was helping Hong Kong government to buy IBM machines and also DB2. And at that time Hong Kong government was not an IBM customer. So IBM sales had been working with them for a long time.

And one part that was interesting was the immigration. They wanted to go and put everyone, every person in Hong Kong in a database so that they can go and search very quickly. Or when you go to the immigration office, when you get off from the airplane to go to immigration, you want to go and pass through it very quickly so that they can check your name, see whether you are a good person, that you can get in.

The problem that they had was at that time they found that it took five minutes to go and find a person's name because the database was so big. So, I did a design review with them. And we asked them to rewrite a query and it improved 4,000 times. It comes in sub-seconds, so they're really happy. And at that time, they said, I really want to buy IBM machines, the System/390, DB2 and all that. And because the immigration office [was] going buy it, and then the housing [office] was also interested, all the other government disciplines are now interested in hearing how to switch over to IBM machines and software.

And then I remember at that time, the sales was really so happy and brought me out to the most expensive restaurant with the crystal, ice crystal and all of that. Just treated me like a queen.

So, I really think that everything... when I see a customer really happy with our product, that is really the most recognition that I would like to see.

LASEWICZ: Sounds like a good feeling. As you look at the various positions you've held, are there any common threads from position to position that you can say that I was attracted to this position because it played to new strengths of mine or anything along those lines?

CHENG: Well, I think that I do work in data management for a long time, but I do work on many different areas in data management. Even from the beginning I worked on the buffer manager, then I worked on optimizer, I worked on structure generation. Look at different components and then I worked on different technology, Internet, XML, pervasive computing and so on.

So, I do think that one common thread is that you must enjoy what you're doing. You find interest, passion. You

know, once you have all of that, you will do really a good job.

LASEWICZ: You've been with the company since 1977.   And much has changed revolving around the role of women in the company since then.   Have you been a part of this change? How has it affected you being a woman operating in a technology company?   Have there been changes that you've noticed?

CHENG: Well, I think a lot of technology that we are working on is neutral to gender.   So right now, I think there is more emphasis on women markets, for example. And I've noticed that women and men probably are quite different. Like my son, he would go and read the manual and pages and pages of the manual before he'd go and do something.   But women may not have that patience to read all the manuals.

So I think ease of use is really important in the product that we are doing.   And I think the Internet really achieved that.   You can see that the Internet is not just only used by professionals, it's used by everyone, kids and housewives, grandpa, grandma.

And why is it like that? It's because it's so easy to use. So, I think women did help in influencing the ease of use part -- make really easy to use, make it intuitive. Why have lots of manuals for people to read before you can know how to use it?

Now, I myself, am not particularly involved in this technology, but I saw that. Like I do work on the pervasive computing and the devices are really cumbersome. Now the cell phones have become smaller and smaller they are easier for women to carry. We don't have all the pockets in a smaller skirt.

And I saw IBM also work with some usability, UCD (Usability Design Center) person that designed jewelry that has also the device embedded in it. And I think that is really fun and I think that is really going to result in more consideration for women and women's markets.

LASEWICZ: Has there been any kind of a clash for you because you came from a Chinese family with traditional values and now you're in the corporate environment, with a different set of values? How has that played a role over the course of your career for you? Has that been an easy adjustment for you?

CHENG: I don't think that has been much of a problem for myself because, as I said that I grew up surrounded by boys. So I really don't see any difference in terms of the gender.

And in particular, for the technology it is more important on what you know, people respect you because of your expertise, not necessarily because your gender. So, I don't see really that as a difference or problem.

LASEWICZ: As you've gone through the company in the last 26 years now, what are some of the challenges that you faced and how have you overcome them?

CHENG: I work on the emerging technologies, leading edge technologies. So, in general we are always facing two problems, two challenges.

One is how to sell your idea. And the second one is, once you sell your idea, how can you go and deliver it fast. And the first one is really getting harder and harder. Top management and executives are very much focused on where is my revenue. However, it's not impossible.

So, you just need to be... definitely you need to believe in what you're doing. You have to be persistent, when you get the first NO, don't give up. And you have to find ways

to go and convince upper management executives the value of what you're doing.

So, if this one doesn't work, try another way and then try until you succeed. So, I think that's the way.

And the second one is now you've got it, you asked for it, you got it. Then they want immediate delivery. They want it yesterday, it's not tomorrow. And so that is also a challenge of how to go and get things out very fast.

And also how to set expectations so that people don't think that you are giving the perfect solution. Let's say if I need to go and get something delivered this year, so I will stage it. I will stage in some functionality so that I can have something out. But I also need to set up the expectation to sales and customers that this is not the end, this is just the beginning so that you don't oversell the expectations.

LASEWICZ: One of the issues facing everybody today is work life balance. Can you talk about that a little bit how you've been able to achieve that over the years?

CHENG: I have one son and one daughter, both of them pretty big now. One just graduated, my son is 21, graduated

in computer science with a bachelor degree. And he is now working as an internship in IBM. And he already admitted to the graduate school. And my daughter is a sophomore in college.

And so when they were young we didn't have anything for work life balance so we are talking about 18,19 years. My daughter is just reaching 19 this year. So, 19 years ago we didn't have the home terminal program.

So, when I need to go and work late, sometimes I bring them to work. And it really was a treat for them. They were really excited. So I picked them up after school and then bring them to work. And they were really excited and say hi to everyone. So, at the early stage, everyone knows my two children.

But then now it's so good. You can work at home. And you even have DSL lines at home. It's more like a workplace. So very fortunate.

The way that I suggest for work life balance is best is first of all to have your partner to share also your work at home. So, sharing the work of bringing up the children, and I'm very fortunate my husband is very supportive in

raising the children, helping the household. So very supported in that way.

And the other thing that I also feel is important is that don't think that everything has to be done by you. So find some household help. For example, I do find it really helpful for me to have a housekeeper come in and picking the children up from school and bringing them to some after school activity like a baseball game or tennis. And cooking dinner. So I find it really helpful for me.

I wish I knew her from the beginning, but we've been with her for 14 years, we were fortunate. So finding household help.

And then another thing is really focus on, even though you don't have that much time, that many times, that staying with your children you could go and focus on quality time. Not the quantity.

I always demanded from my children that we all sit together and have dinner together. And that way, then you can go and have dinner and also talk about the day, what happened at school.

So I insisted on that so they cannot go and say, I'm not going to have dinner, I'm going to dinner with my friends and this and that. Of course unless there's some special occasion, a birthday party or something. Otherwise, I insisted that we have dinner together.

And vacation time together is also helping between the family, enhancing the family relationships. So, I think it can be done. And I'm very proud of my two children.

They're two big kids. And I'm real proud of them also, they have good hearts, they are very helpful and friendly to others and they also do quite a lot of community work.

LASEWICZ: You had mentioned the ability to work from home is something that the company does that makes it a little easier to balance.

CHENG: And also flexible hours is very helpful. So, if there are times that you need to go and bring the kids to see the doctor, you can do so and you can work later at night. And so I think flexible hours, working at home, home program, home terminal. All those are very, very helpful for work life balance.

LASEWICZ: Getting back to the specifics of your career. What do you consider to be your most important contributions to the field, to technology?

CHENG: Well, I certainly think that I contributed in changing the way of a living.

LASEWICZ: That's it?

CHENG: That's it. I think that's very important. And I think a lot of time you may not go and see that until you think about the old way you do the work and you can see other technology.

As I mentioned that almost all Fortune 500 companies are using DB2. My first real product. And so if you're looking at all the things that can be done now. Give an example like when I come here, I can go and book ticket on the Web with online reservations. And I can get my seat assignment, I can choose and I know who are the people whether the seat is occupied or not and I can choose a seat and I can print the boarding pass. The thing about all that before, you had to go to the counter and waiting on a long line to buy a ticket, get a seat, check in, everything is lines, waiting and waiting. Now you can do it all online.

And I contributed that. All the information is stored in database and we put all the information so that you can access on the Web, on the Internet and even go and now besides the Internet, you can get it on other devices and cell phone.

I don't know whether you remember one of the IBM ads -- I think it is in Italy when someone was trying to go and buy a Coke from the vending machine and he doesn't have enough change.

And so he's trying to go and grab it from the fountain. And then he got to grab some money and then the nun was staring at him with disapproval. But on the other hand the lady comes by with a phone, pushing a button and get a Coke.

This is what I'm building and I'm making it happen so I feel really excited. I'm changing the way of life, the way that people are living. For better.

LASEWICZ: That's a good feeling, isn't it? It's nice to be able to see that connection between the work that you do and the impact that it has out in the real world.

LASEWICZ: What would you say are the qualities that make you successful at what you do?

CHENG: I really think the first thing is enjoying your work. Love your work. Because if you enjoy and love your work then you can, it's amazing that all the other things - drive to achieve - all of it comes to it because you enjoy doing your work, you will do it, no matter what.

So drive to achieve will come of it. Personal dedication. Passion for business will come with it because you enjoy your work. You do it because you love it. So I think one of the attributes is I really love my work and enjoy it. And that's the driver for all the things that come out.

I think another attribute is my persistence, and I don't take no that easily because I always get no. And so I go and think it over and how should I come back with a different angle. Then I come back again. So I think persistent, perseverance is also important.

LASEWICZ: That sounds like two essential qualities there. Is there anything that you would like to add about your career or advice you'd like to give to people who are coming up and possibly looking at technology as a career?

CHENG: Okay my advice to everyone is first of all you should really enjoy your work.   If you don't enjoy your work then you should look into how can you go and change it so that you feel happy and enjoy what you are doing.

And if not, then maybe a different job.   So I think first of all everyone should go and say, I really like my job.   I enjoy doing what I'm doing.   If not, step outside and do the same work in a different angle.   Look at a different angle.   Then you may find a different light in your job.

And you should do the best. Always do the best.   Take every assignment seriously and do your best.   And after you do your best and you reach that part, then you should stretch your limit.

Don't feel content, don't feel satisfied and staying at that level.   Always stretch your limit and that's how you grow.

LASEWICZ: Words to live by.   Thank you very much for taking the time to sit down with us today.

CHENG: Thank you.