



# Sloan Career Cornerstone Center

## Profiles of Mechanical Engineers



**Melinda Cecacci**

**Aerospace Technologist - Flight Control  
NASA Johnson Space Center  
Houston, TX**

### **Education:**

BS, Mechanical Engineering, University of Akron

### **Job Description:**

Aerospace Technologist, working in mission control as a propulsion systems engineer, and working with astronauts to solve in-flight propulsion problems.

### **Advice to Students:**

"Polish up on your presentation skills, your communications skills. Learn how to learn; work hard while you're in college. It's four or five short years of intense studying and sheer excruciating pain, but it's going to pay you off for the next forty, fifty, or however many years you decide to work after you graduate."

### **Comments:**

Melinda feels that one of the best things in her education was the co-op work program -- in fact, she says that without her co-op experience she wouldn't be at NASA today.

### **Video Transcript 1:**

"We have to sync up with other places in the world that are, of course, at different times. When it's nighttime here it's daytime there. So we have to make sacrifices and maybe work, you know, through the middle of the night or, you know, three days straight, changing off shifts. In addition, during flights, the shuttle's up 24 hours a day, for however many days that mission's supposed to be."

### **Interview:**

Co-oping was an essential part of my professional life. I wouldn't be here at NASA Johnson Space Center without my co-op experience. The event that I'm proudest of in my short time here at NASA was working on the mission of the first joint docking of the Mir and the Space shuttle. That was the first time that we docked with the Russians since the Apollo mission in 1975.

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I would advise engineering students who are just starting out or those who are about to graduate, to polish up on your communication and presentation skills. This is important in my job at Johnson Space Center, where I work on a team of flight controllers who come from many different backgrounds -- math and physics majors and engineers from electrical to civil to mechanical to chemical. We are more effective because we can draw upon and share a wealth of knowledge.

Women have unbelievable opportunities today compared to what they had ten or twenty years ago. I think it is important to understand that everyone should be qualified for the job they do, whether they are male or female, black or white, Hispanic, Chinese -- it doesn't matter. If a person is qualified to do the job, they can get to where they want to be.

**Q: For the record, please tell me your name, who you work with, what you do, how long you've been there, and your age.**

Ceccaci: OK. My name is Melinda Ceccaci. I work for NASA-Johnson Space Center. I am an aerospace technologist, which means I am a flight controller for space shuttle operations. I am 26 years old and my degree was in mechanical engineering.

**Q: Thank you, Melinda. You're a young person, you are bright, enthusiastic, you look like you're in good shape, you like your work, you've got a lot going for you. Tell me, in terms of the job market, what do you think are your best qualities or the best you have to offer, and how do you think your particular job with NASA helps bring that out?**

Ceccaci: My best qualities probably are my ability to work in a team environment. Working in a team you have to earn the respect of the people you work with, and that's a very important thing to learn. And to earn respect you have to work hard and be diligent, and I think those are the keys. I think that as part of a team you have to earn respect of your peers, and the best way to do that is to do your best always in all things that are given to you -- big or small tasks. Teamwork is always a skill that you want to be able to carry away from any job, because it will be well-used in any other job that you try to attain in life.

**Q: Every job, however, can be boring from time to time. Tell me what, if anything, is boring about your job, and how do you deal with that?**

Ceccaci: In the position I'm in right now, I have to do a lot of studying. I'm not certified as a flight controller in the systems. I am currently working with a navigation and control system, so I have to spend a lot of time reading workbooks and documentation and flight rules, and that gets to be really monotonous and easy to put you to sleep. It's like when you would read texts in college. The best way to do that is to try to use different media to do your training. Here at NASA we use classroom, flight-controller trainer classrooms where there's a computer interface. We have computer-based trainers where they have lessons on the computer, and those are really neat because they cover a wealth of text, and then break it up with questions to test your comprehension of that material. So, using the computer-based trainer, the flight controller trainer, or even going over to the control center and doing some on-the-job training while a real simulation, or a real flight, is going on, is probably the best way to get out of that monotonous hole of boredom.

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**Q: OK. I'm a co-worker, and I'm in some ways your superior or supervisor. I come over, we're talking about your work, and I tell you directly to do something that makes absolutely no sense. How do you deal with that?**

Ceccaci: It doesn't happen. I'm trying to think of how I would deal with that. I would want to understand why I'm being asked to do the task, so I would ask questions and try to figure out what is trying to be obtained from this task I'm supposed to be performing. If it's a legitimate reason that I'm supposed to be performing this task, I have to put aside my feelings of how menial or how trivial this task may be, and I have to do it. And, like I said before, how you handle small tasks will inevitably affect how you handle big tasks. So, it may be a test on their part to see how willing you are and how well you will do something, no matter how simple or stupid it may seem.

**Q: Let's say I'm from Shell Oil. I meet you, I like what you do. You tell me about your job, what you're doing. I say, "Melinda, you're making X dollars a year working for NASA. I'm going to offer you twice as much, and if you're not happy after a year, you can go back to NASA." What do you tell me?**

Ceccaci: I am a person who takes pride and takes value in what I do. If I'm not happy with what I'm doing, all the money in the world isn't going to change that. I'm extremely happy in my job right now. I am doing a job that is an opportunity of a lifetime, and if I leave this job I may never have the opportunity to do it again. Right now I'm very happy with what I'm doing. I think the experience I will gain here will only make me better in the future. So I would probably turn that job down. Money is not everything.

**Q: True, thanks. Do you think that advancement opportunity in the world of mechanical engineers in general, and at NASA, is as open to women as it is to men?**

Ceccaci: Women have unbelievable opportunities today compared to decades ago. However, I think it's important to understand that everyone should be qualified for the job they do, whether they be male or female, black or white, Hispanic, Chinese, it doesn't matter. If that person is qualified to do the job, they will get to where they want to get. It seems like the government has made a huge effort in making sure that there is no discrimination. I would like to think the people get their jobs because they're qualified.

**Q: You've obviously studied a lot of things about mechanical engineering. Looking back on your work in the university or college, was there anything that you studied that has almost no value to you today?**

Ceccaci: There are a lot of things that I studied that I am not using today. But the idea in school, looking back, I think the key was to learn how to learn. What people do here at Johnson Space Center, or any of the other NASA centers, are tasks that they learn on the job. They are things that they will learn how to do from the peers that they work with, from the specific documentation that's developed at that company, and I think that's true of any corporation. There are going to be many skills, if you're in design or manufacturing, that I'm sure, I'm certain you're going to use from your studies and the texts and the classes that you took in college. However, in my current job I don't use many of those, but the basic

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foundations that I learned through those four years of college very much apply to my understanding of the systems that I work on in the shuttle.

**Q: When you came to speak to someone at NASA about working with them, what do you think the three most important things you wanted to get across to your prospective employer were during that interview that you thought would make you an attractive employee here?**

Ceccaci: I'm hardworking, I'm reliable, and I love my job. And the way you feel about your job will directly reflect on the work you produce. So, those were probably the three things I would have pushed when I talked to my prospective employer.

**Q: Are there any -- and if there are, tell me about them -- personal sacrifices you feel that you're making, willingly or not willingly, to be an active and valuable professional at NASA?**

Ceccaci: There are going to be sacrifices in any job you take, whether it be traveling across the world for any amount of time, working crazy hours, etc. Here at JSC, the one that we're probably most faced with is the odd hours, particularly with the joint operations, with the European Space Agency, the Russians. We have to "sync up" with other places in the world which are, of course, at different times. When it's nighttime here, it's daytime there. So we have to make sacrifices and maybe work, you know, through the middle of the night or three days straight, changing off shifts. Of course, somebody's going to have to work in the middle of the night. So that's probably the biggest sacrifice we have to make. In addition, during flights, the shuttle's up 24 hours a day, for however many days that mission's supposed to be. That may be, for example, 17 days long. Well, you're pretty much out of commission for 17 days as far as doing anything in the real world because you're expected to be here. Somebody has to be here 24 hours a day, and those are split into three shifts. So, you may be on one of those shifts that aren't the most pleasant hours. So there are some sacrifices that have to be made, but when you like what you're doing, the sacrifices don't seem so big.

**Q: Do you have friends on the job that you made here?**

Ceccaci: Just about everyone I work with has become a friend in some capacity, some more than others. And it is very much like a family environment.

**Q: What do you look for in co-workers that makes you feel a part of this work, together as opposed to apart from? What signs are you looking for, to feel integrated with your fellow workers?**

Ceccaci: You always want to have the respect of your peers and your fellow workers, and the way that you know you have their respect is that they will bring you assignments and they will bring you tasks to do, and they will expect you to do them right, and to do them well. And if they keep coming back to you, you know that you've done well, so you always want to be pleasing them as much as they are pleasing you. We have to use each other to teach each other. People who have been here longer than me are responsible for training me as well as people who have come in after me. So, when they help you out and they teach you something, they expect you to become more proficient and to be able to pass that knowledge

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onto people below. Another good point towards this end is when we're in the mission-control center and there's a space shuttle up in orbit and there's a problem going on, that person who's in the front room who's been here probably several more years than you is looking to you to help analyze that failure and to give you good recommendations. They want somebody who's going to be hardworking and who's going to be diligent in their studies so that they can provide the best solutions possible.

**Q: You seem to have a good sense of humor, and you're vivacious. Is that part of your job, and if it is, do you think that's important, or not?**

Ceccaci: Not everyone is as bubbly. (SHE LAUGHS) Or vivacious, like you said, as myself. But, in general, the people who I work with like to have fun. They take their jobs very seriously. But you can't take it so seriously that it's going to create a stressful environment. The job that we have at hand is stressful enough so that you want somebody to keep it even-keeled. You don't want to go one way or the other on the spectrum, and that's a good way to do it.

**Q: Let's say, I'm a coworker of yours. How you look is partially dependent on what we do together. I have a problem. It's personal. You don't know what it is. It could be drugs, it could be a bad marriage. But whatever it is, it's causing me to not do my job well, and it's causing you to not look as good as you should. How do you handle it? What do you tell me? What do you do?**

Ceccaci: I think it's very important to go straight to the source of the problem, and I would sit down and talk with that person and, openly and in confidence, try to offer my help, if I could. Because if it's going to help them, inevitably it will help me. Because if it's looking poorly on my work record then obviously -- since this person's working with me -- I would want to get that corrected. So, I would try to resolve it with that person, and if that doesn't work, after at least a couple of attempts, I may ask that person to come with me to our supervisor and sit down and try to work it out.

**Q: Melinda, do you miss school?**

Ceccaci: If you would have asked me that right after I got out of school I would have said, "No way." When I finished school, I had worked very hard through those five years, and it was five years, because I "co-oped." I was ready to get out and do something new, I was ready to make some money and to be on my own and not be responsible to my homework or my professors or whatever it would be. After about a year, though, I did miss the interaction with people. I missed home, I missed just doing homework problems. Because, like I told you, I don't use a lot of the stuff that I'd learned, and I hate to feel that slipping away.

**Q: What are you chasing professionally? What are you looking forward to?**

Ceccaci: I think that I can do anything I want to do, and I firmly believe that. People create their own limitations when they cease to believe that. So, as far as my opportunities, I have a wealth of opportunities from where I am now as a flight controller. There are lots of positions to move up into, management-wise, given the correct amount of time put in. Even outside of the center, having worked hard and worked in a job that is so prestigious; it looks really good

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to outside industries. I think there is a connotation with working with NASA. They tend to pick the "cream of the crop." So, I would like to think that connotation would be attached to me if I chose to look for a job elsewhere. So, my opportunities are pretty much limitless, the way I see them. And as far as what my immediate plans are, I would like to become certified as a flight controller in the mission-control center, and after that I'll decide where I want to go.

**Q: Great. I have one last thing to ask you. If you were speaking to mechanical-engineering students today who are seriously considering your field or a related field, what would you tell them are things to look for within their experience that would indicate to them that they shouldn't continue their studies and pick another field?**

Ceccaci: There's no easy way to know if you're going to like doing what you're studying -- when what you're going to be doing is five years down the road. So, the best way to do that would be to assess how you're doing in your schoolwork. How are your grades? How is the homework? Is it really, really hard? Are you finding yourself not understanding anything? Are you finding yourself understanding things but not really liking it? There were some classes that I didn't like, mechanical-engineering classes that weren't my favorites, but for the most part, those were few and far between. So, I think that those are the best indications -- without actually going out and talking to mechanical engineers, or without going out and looking at the jobs that mechanical engineers do.

**Q: Good. Thanks. That was very good. I appreciate it. Anne, is there anything you'd like to ask Melinda?**

**Q: Yes, I want to jump in and just do a couple of things. For the sake of students who are studying different software programs and things like that, what do you use now? Did you learn them on the job? Would you suggest --if you could go back -- would you have done any more training on your own or software programming, anything like that?**

Ceccaci: Definitely. As far as software's concerned, we use Microsoft Office products -- Microsoft Word, Excel, etc. You definitely want to become at least proficient enough to use the application. You might not know all the "ins and outs." What I did learn, I learned on the job; although I guess I did learn some of my skills in school. They had some of the applications that I'm using now, but there are so many new applications, as time wears on, that you really need to keep up with it because it can change greatly. As far as programming, I didn't take many programming classes in college, and that is one thing that I would have gone back and changed if I could. Programming can be used anywhere today, as we're becoming more automated and more technologically diverse. Programming is the key.

**Q: Before, when you were talking with John, you had mentioned international work. You were talking about the time difference and things like that. Can you talk about your involvement in international projects?**

Ceccaci: As you probably know, we're working towards the International Space Station, or ISS. And that is a joint effort between NASA, the European Space Agency, the Russian Space Agency, the Japanese, and the Canadian Space Agency, and a few others I probably have left out. We're going to start to put together the International Space Station in about a year here. So, as a flight controller, I am indirectly involved in that goal, as far as ensuring that the shuttle

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systems continue to work properly -- in that they stay healthy, or at least in a fashion that we can use them, so that we get this International Space Station put together.

**Q: What are you proudest of that you've worked on here, or even in your co-oping experience? What has been the one thing you've done professionally that you're really proud that you were involved with?**

Ceccaci: The thing, the event, that I'm probably most proud of in my short time here at NASA was working on the mission of the first joint docking of the Mir and the Space Shuttle. And that was the first time we docked with the Russians since 1975, the Apollo.

**Q: You said money's not everything, so how would you, in your career so far, how would you define success?**

Ceccaci: I would define myself as successful. I'm happy with what I'm doing. I'm making enough money to live comfortably. I enjoy coming to work every day, getting out of bed and knowing that I'm coming to NASA, and working with some really incredible people -- very, very smart people.

**Q: What do you like to do, on your own time? What are things that you like to do out of work? Is it just good to get away mentally, or what?**

Ceccaci: It's always good to get away and take a breather, because this is an intense job. I enjoy playing softball and volleyball. My husband and I participate in a lot of social activities. We have lots of friends, a lot of friends that work here with us who have that kind of understanding of the things that we're expected to do every day. So, it's fun to get away with those people and have fun with them, instead of always having that "face" on at work where you have to be that professional.

**Q: If you had the chance to talk to college students, what advice could you give to them as they're gearing up to start looking for jobs, or even just co-oping and interning and things like that?**

Ceccaci: The advice that I would give to engineering students today who are just starting out, or even who are just finishing up is, "Polish up on your presentation skills, your communications skills." There is no way to communicate with somebody if you don't have those skills within you, and you will get yourself a whole lot further if you are understood. So, work on your presentation skills. Learn how to learn, work hard while you're in college. It's four or five short years of intense studying and sheer excruciating pain, but it's going to pay you off for the next forty, fifty or however many years you decide to work after you graduate.

**Q: Could you talk about co-oping? The value you think that co-oping added to your professional life.**

Ceccaci: Co-oping was such an essential part of my professional life. I wouldn't be here at NASA-Johnson Space Center without my co-oping experience. I was fortunate enough to attend a university which had an incredibly strong co-op program. So, having attended that school, I was able to fall into that pattern that many students before me had chosen. As a

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matter of fact, at the time I was going to school, 80-some percent of the students at the University of Akron participated in the co-op program. So, you're almost expected to co-op. And I'm really, really glad that the percentage was so high. I just kind of followed the crowd then, and I provided myself a wonderful opportunity of a lifetime.

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