4-9-2011

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Date: April 9, 2011
Riverwoods Conference Center, Logan, UT
Interviewer: Sarah Fassaman

Name: Kristen Redd Wilkensen

Date of Birth: February 28, 1971

Place of Birth: West Point, New York

This is Sarah Fassaman. I am at the Riverwoods Conference Center in Logan. It is April 8th and I am interviewing Kristen Wilkensen. Could you say your first and last name and your birth date and birthplace?

Kristen Wilkensen, although when I was in the GAS program it was Kristen Redd. My birth date is February 28, 1971, and I was born in West Point, New York.

Was there anything in your childhood that got you interested in space?

Absolutely. My dad was in the space program, so my dad, Frank Redd, actually…we ended up at Utah State University because he was hired as a Professor. He was in the Air Force, but had been assigned to space division, so he worked on the Space Shuttle Program. And then he worked… I have a memory—I was pretty young—but when the Voyager spacecraft went past Saturn, my dad got to fly out to wherever it was that the pictures were coming in. I still remember that he came home from that trip and had pictures of Saturn with the rings. That was the first time that they knew that instead of three rings, all of the rings were made up of tiny little rings and he had pictures of it that he showed us all. I was just totally excited about it all. It was Space that got me interested from then on.

Okay, what years were you at Utah State—I guest why did you decide to come to Utah State?

It was a little bit of a default thing because we loved here. My dad was a professor at the University. I got a scholarship, so I was actually going to go other places, but I got a really good scholarship and so last minute when I realized I had missed the deadline for some of the other Universities I was planning to go to I said, "Good, I will just go to Utah State." And I could live at home so it was cheaper, so that was good. But also, because they had the space program, which is what I was interested in, so it was good.

What years were you at USU?

I started in 1988 and I graduated in 1995.

Did you major in Physics?

I majored in Mechanical Engineering.

What projects did you work on while you were with the GAS team?

I worked on the bubble experiment. We called ourselves the "Turbubulance Group," which is sort of a joke because it was turbulence—I think it was actually called "Thin Films in Microgravity." But we just called it the Bubble Experiment. I don't know if you care, but the way I got into that project, I didn't actually know about the GAS program but I was taking my first year Physics classes from Jan Sojka. He is an awesome teacher—he is really good. He had told us at the beginning of class that if anybody ever, like when we took a test and he graded it, if we disagreed with how he graded a problem we couldn't go and complain to him or argue about it, we had to submit our complaint in writing. It was the only way he would consider anything. So I think it was the first test that I took in his Physics class (or maybe it was the second one) and I disagreed with how he graded one of my problems. I was the type who always argued for points. So I wrote him a 2-page essay on why I thought I was right. It seems crazy now, but anyway, he called me into his office. So then I got kind of nervous—I thought, "Oh boy, what did I do?" He called me into his office and he said, "So, would you like a job?" I think I got the points on the test, but the really great part was I got the job in the GAS program, which I didn't even know much about at that point, but the bubble experiment had already been built by one group of students and it was kind of—I think they were leaving so I got to move on and take over a lot of that and learn. I was a freshman, so I got to learn a lot.

What was the bubble experiment? Could you describe that a little more?

Yes, the idea was they were talking then about how do you build structures in space. You know, what is an inexpensive way to, say, put up a space station or something like that. So the idea, one of the ideas that people had is that you could take a material sort of like an epoxy or something like that that is heat cured or ultraviolet cured. So you fly up into space and you blow a huge bubble and then the Sun would actually harden it into a solid structure. Then you could hook these structures together and you could build big spaces—you didn't have to carry up a big thing into space to make it into a big enclosure. So that was kind of the idea. So our experiment was to say, okay, the problem is if you have a big bubble like that and the sun is heating up one side then you have—then you will have turbulent flow of–I can't even explain what I am trying to say because I am on the microphone and that was so long ago. I am trying to say that basically when you heat up one side you are going to have stuff flow in some way. So we were looking at how that material would flow around the bubble and if it would get thin on one side and thick on the other because it would heat up and what would happen on the surface of that bubble. So the experiment—I have been looking at the one they are doing tonight and they have all these cool high-def cameras—we had an actual huge video camera that took up most of the space of the whole experiment and then there is the humungous battery pack we had to have to power the whole thing. There was a tiny little part that blows a tiny little bubble, and then there was a light bulb that would come on. So they would blow a bubble and film it and then the light bulb would come on and heat up the one side and you would see what would happen—it was purely visual to see what would happen on the surface of that bubble. That was basically what the experiment was, but you had to be able to—the difficulty of the GAS program was, I don't know if you know but, basically it has to be completely self-contained, no body gets to switch any switches on, there is power to the whole can that goes on and that is all. Your experiment has to sit forever and still you have to be able to blow a bubble reliably and have everything come on and have everything test and have your batteries power everything and have it all work.

Was it flown on the Shuttle?

It was flown, but at that point I was no longer—let's see, I am trying to think what year it flow. It was like 93 or 94 because I had gone on a mission for my church and when I came back I kind of dabbled in the GAS program but I never had a job or an actual position after that, so I kind of got to be involved and see what was going on, but it flew at that point, like after I was—I was doing a summer job at BYU when it actually flew. A bunch of students went down and I was going to go with them but I didn't go because I hadn't finished the project I was supposed to do for the scholarship thing I had gotten that summer. I still totally regret it. I wished I had gone—I can't believe I didn't go see it fly.

So were a bunch of students going to see the Shuttle launch?

They did that time, yes. So it was—my husband could tell you what number because he was one of the students that went. I think it was STS-256 or something like that, so anyway it did fly. But, may years later, I mean way, many iterations later. Because when I had it the furthest we got was we did fly it on the Vomit Comet, the KC-135, so we, Bill Decker and I, got to go to Houston. We didn't get to fly like the students nowadays actually get to fly. We totally wanted to, but we didn't get to, but we had to mount it on there and tell them what to do. Although I swear, Bill doesn't think Ned Penley was there but I think he was. I think Ned Penley got to fly with it. I think he was the grad student that was in charge of the things at the time. Because he was doing other experiments too with thin films on the plane. So anyway we got to go down there and that was a totally cool thing for me to do as a student. They paid for us to go down so we got on the plane and got everything hooked up then they would fly. Ned was also pulling—he had to be there, I think Bill just forgot, because this was the cool part. He was pulling thin films straight, like he would have a bar at the bottom, this is hard to describe on a tape but he had like a pool of liquid and he had two vertical bars and a bar at the bottom that would sit in the liquid and he would pull it up so he would make a rectangle that was like a bubble kind of. And so he was doing that with different materials, cause usually you would need like soap in your bubble or in your liquid to form a bubble—a surfactant of some sort. And so he was experimenting with different surfactants to see which one made the most reliable, strongest film, because you don't want it to pop or whatever. So he was doing that and he found out, you know on the progressive days of experimenting, he used less and less surfactant and he finally completely cleaned it, you know, and used pure water. You could still pull a film when it was zero-G. Which was the—That was what we found out from that whole experiment. That was pretty much our big discovery was that in zero-G you are not fighting gravity—gravity isn't fighting the surface tension, the surface tension was enough to make a bubble. That was kind of cool. So anyway I did get to do that and then I went off on my mission and other people took over the experiment and it finally—you know—it was in a fiberglass case that you put inside and they moved it go an isogrid, which was the aluminum sort of next generation thing that they flew it on, and lots of other modifications were made before it actually flew but…

What are you doing now and do you think that your experiences in the GAS program helped you or gave you skills?

Okay, now probably doesn't apply because now I am just at home being a mom. Although it was totally a fabulous experience. Everyone was talking about how getting your hands dirty with an experiment makes all the difference and it really did. I mean, I can't even—I was totally shy when I first, I still remember—I was in this lab and Ned Penley said, "Okay, here is your experiment for the Space Shuttle—go at it. You need to take it apart and put it back together." I was like, "What!" You know, it was really scary. I thought, I will break something. This is a big deal. But he knew you just had to learn—I mean everything you change something you had to totally dismantle this complicated thing and put it back together. So he had me learn pretty much by doing it. I still—this is dumb but yesterday we were with my inlaws, or some of my kids cousins, and they dropped my daughter's ZhuZhu pet off the top of the stairway and it got broken at the bottom and they were like, I am sorry, we will have to buy you a new one. I was like let's see if we can fix it first. So I got a screwdriver and took it apart. I found out what was broken inside. They said, "Wow—it is so great you are an engineer." I thought it wasn't anything I knew, it was just that at some point someone taught me to take things apart and figure them out. You know what I mean. So I kind of like that. I kind of think that helps me. When I graduated I went to work at TRW and there were a lot of people that worked at TRW from one of those high class Engineering Universities—I can't say it right now cause I am on tape—but I found that I knew much more than those students with a bachelors degree—I was about the same level as the Masters degree students just because of the things—the experiences I had a Utah State. A lot of it being the hands-on kind of stuff. I probably got the job partly because of it too and got better pay. It was a pretty great thing to put on your resume. And even like—okay I am thinking of other things—my senior design project, right before I graduated we had to do this senior design project, and there were lots of different choices, but I ended up on a team where we chose to design and build a remote-controlled airplane. It had to be really light because most of those work up with a gas motor and we had to do an electric motor, so it had to be really light. It had all kinds of requirements. We had to completely design an airframe and build it from scratch and make it work and fly. So there were two teams of us. At first I kind of thought that I got the not so good team because they were not the straight-A students, but I found out that on my team there were people who had had hands on experience in their lives. I had not so much in my life by in my education because of the GAS program. So our team actually did a lot better than the higher grade kind of students on the other team just because we knew how to build stuff. I don't know if it makes sense, but if you have actually tried to put something together or tried to use a certain material or tried to use a certain tool you have a lot better idea of what you can design to build with that material or tool. So it made a big difference—and our plane flew so it was pretty cool.

You have mentioned a few students like Ned Penley and Bill Decker. Do you remember any of the other students?

Those are the two I worked with the most in the years I was there. The ones who, like Casey Hatch—he got mentioned a lot by people, he was a good friend of mine from high school. He joined the program right before I left on my mission and by the time I got back it was a lot of people that he knew, so I got to know a lot of the people who were in the program after that, including my now husband, Mark Wilkensen. His brother, Mike Wilkensen, was also in the program. He got to fly on the Vomit Comet, which was actually really cool. Matt Droter I met through that second half of the program. The guy who now teaches math at BYU, I can't think of his name, it will come back to me in a minute. There are several more people who's name I can't say because I am on the spot.

Do you have anything else you want to say about the GAS program—maybe funny memories or ironic memories or maybe some bad experiences you had?

I am trying to think if I have anything good enough to tell. It was just kind of a fun—you had your own spot where you belonged. On campus, you are just one of the students wondering around and doing your thing, but there was the lab where we worked and we got a little office space with desks and you got to have your own desk and be there with a group of people—it was just cool. It was nice to have camaraderie sort of and that kind of experience. Funny stories—you would think I would remember. I remember our Turbublence T-Shirts. It just had round circle bubbles on it and said Turbublence Group I think. I don't even know what happened to those. It's kind of funny. Jan Sojka, he is just great. He supported the whole program. He is always the kind who is just like really positive and gets you going. He was really great. I remember Houston was so hot. I had no idea—I had never been anywhere with humidity like that, so when we flew down there to put these experiments on the plane, you know it is like you are in this air conditioned whatever—building or car, and then they would take us out on the runway and put us in a hanger that had the sun beating down on it and it was like 95% humidity. We were just dying. It was difficult to even function. You are in this heat all day trying to do your experiments. It was just cool to be there—that was probably the highlight of what I got to do.

Anything else you would like to add?

Oh boy, I shouldn't tell you that the bubble experiment didn't work. I did get to be there when the can came back from NASA and we unpacked it. We got to unpack the experiments and we had a party. That was cool but I didn't get to be the one who actually got to go look at data but it turned out the power never even went on. The bubble experiment didn't even ever get to do anything after all those students and all those years. But you like to think that at least we all learned a lot, even if we didn't learn anything from what the experiment did. That was kind of sad.

Okay, I was in there looking and it is there—the bubble experiment is on the table in the back there. We were looking at the batteries—oh the batteries—you have got to ask everyone else. I hope they will tell you these stories, but the batteries were these huge lead acid batteries and you had to have a whole pack of them. So they were rechargeable. They were one of a few that were allowable by NASA. So we had to recharge them, but we had to drain them and charge them, drain them and charge them, until you got them to their maximum capacity. So that was one of the tedious things we did all the time, get new expensive batteries and cycle them until they were good. Then you would wire them up with this whole pack of 18 and then we would do the shake test and something would always fail or some wire would come off. Then you would re-solder everything and try to get all of your connectors on this humungous battery pack. So then they decided someone was going to build a cycler where you could throw all the batteries in and it would cycle them all at once. That was some crazy nightmare. I don't know why that was never easy to do. It took forever before that ever happened. Nowadays power is no big deal. The controller, I was controlling in Basic and Assembly Language and then you would have to put the program on the eProm and put the eProm back on the board and then screw the entire experiment back together and see if it worked. And it didn't, so you would have to unscrew everything and take out the whole controller board, which was gigantic—it has all changed so much now. It is cool to see what the students are doing now.

Thank you very much for talking to me. I think you gave us some good information.

You are welcome—thank you.