

An Interview with
CRAIG ROBINSON
OH 470

Conducted by Jeffrey R. Yost

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Abstract

With support from the National Science Foundation (Grant No. 0811988, “Designing and Using FastLane: Distilling Lessons for Cyberinfrastructures”) CBI researchers Jeffrey Yost and Thomas Misa conducted oral history interviews with 70 NSF staff members as well as numerous additional interviews during 29 university site visits. An overview of the project is available at www.cbi.umn.edu/oh/fastlane/ and a complete set of 643 publicly available interviews is at dx.doi.org/10.13020/D6RG6B. Here on the CBI oral history database is a selection of notable NSF staff including Joseph F. Burt, Jean Feldman, C. Suzanne Iacono, Constance McLindon, Carolyn L. Miller, Paul Morris, Andrea T. Norris, Erika Rissi, Craig Robinson, Mary F. Santonastasso, Rich Schneider, Frank P. Scioli, Beverly Sherman, George Strawn, and Frederic J. Wendling. Topics common to many of the interviews include the design and development of the NSF’s FastLane computer system, interactions with users, e-government initiatives, grants management practices, peer review, and NSF policies and practices. These interviews span a wide range of NSF staff, from program officers to senior managers.

Dr. Craig Robinson is acting director of the National Science Board Office. He previously served as a project leader and then branch chief for the NSF FastLane team. After providing brief background on his work in astrophysics prior to joining NSF, Robinson provides information on the development and management of NSF FastLane. Craig Robinson was the principal project manager during the launch of FastLane in 2000, contributing a research scientist’s perspective to the project and helping to create the internal system known as e-Jacket.

Yost: My name is Jeffrey Yost. I'm here today with Dr. Craig Robinson. It is April 2, 2009. Craig, could you begin by just giving me some basic background on your education?

Robinson: Sure. I am an astrophysicist and I have a PhD in High Energy Astronomy and Astrophysics from Penn State; then before that, a Bachelor's degree in Astronomy and Astrophysics, as well.

Yost: Can you give me some background on your work before you came to NSF?

Robinson: Sure. I was a research scientist at the Harvard-Smithsonian Center for Astrophysics and, just before coming to NSF, I was a gamma ray astrophysicist at the NASA Marshall Space Flight Center working on black holes and gamma ray bursts.

Yost: What led you to come to NSF?

Robinson: I was starting a family and working many hours as a research scientist, so I was interested in a little bit more structure and I saw a position that said that they were looking for someone to introduce new technologies to NSF and that intrigued me. I knew nothing about FastLane at that time; all my research was done at NASA and with NASA research funding. In preparation for looking into this job I actually went to a workshop on FastLane in 1998. It was my first introduction to that. Of course, NASA had nothing like that at the time, and I was so used to a paper process where I had complete control of

everything. I didn't know if I would even like this approach to things, at least at that time.

Yost: Do you recall who was putting on the workshop?

Robinson: It was Carolyn Miller, who was the branch chief at the time and that was in Atlanta, Georgia. So I drove down from Huntsville, Alabama to that and Carolyn was giving one of the standard workshops that were given for researchers and sponsored research office personnel. I know I had problems registering with the system; you had to register ahead of time—I had problems with that—so I found it an interesting system but frustrating from my first experience with it and just some basic issues.

Yost: What was your original job title at NSF?

Robinson: My original job title was as Project Leader and so I was assigned to look at using new technologies and particularly the first project I was asked to deal with was something called the panel management system, a poor acronym, PMS. The idea behind that was to take 10 laptops—laptops had just come into being more common—around a central computer and take FastLane proposals and be able to show them to panelists, or at least the initial concept of it was just to be able to show panelists what proposals were there; to be able to bring them up. I immediately knew from my experience on panels that that wasn't the important part of what this new technology could do. The important thing was to be able to interact; to have an interactive panel system. So even though the project

had just started a few days before I came in, I was asked to take that over. I completely changed it to something where you could interact between panelists, realizing ahead of time that this web-based system allowed panelists who were remote to interact. The way we developed that system was; it seems too common now, that you have a lot of people IMing each other with instant messages. Well, we developed an instant message system so panelists could communicate with one another and write panel summaries and share them with others so that it truly became an interactive environment. This helped really leverage the proposals that were coming in so that you just didn't have proposals that were coming in but all the way through the panels and what the panels were doing was electronic. Then the results of those panel summaries would be electronic and be able to be shown back to the PIs as well. So that really leveraged that system and it was quite different from when I came in, from what people had imagined. What I found with FastLane again and again is that the people that were developing it unfortunately weren't the people who were writing the proposals, that served as panelists, and so on. So I brought that perspective into it and really, it helped share the broader vision of what this could become—not just simply emulating a simple paper process, which is what a lot of the work that had been done to that point focused on—but actually how you change workflow structures once you realize that you could leverage this information that's now in electronic form.

Yost: Were you brought on with the idea that it was important to bring in someone that produced NSF proposals, a scientist?

Robinson: They didn't consider that when they advertised it but when they saw my application they thought, well, it would be interesting to have a PhD scientist involved in the development. Of course, this was all new to me. I used computers extensively as a research scientist but I just found this to be a great laboratory where people were willing to experiment and try new things and you have a lot of people in the community interested in it. The interesting thing is that you had pockets of the community that were very much against this. For example, the geosciences community and the polar science community were absolutely against the idea of the FastLane system and what we were doing. They coalesced around each other. It seemed to be leaders particularly, especially if you got a couple of very prominent leaders who were Nobel laureates, in this case, who would write letters signed by many people in the community. You see that in the history; I have some things in my files of—internally, program officers back in biology, back in the 1970s or early 1980s, when the idea of releasing verbatim reviews to PIs; the idea of releasing verbatim reviews to PIs, many of our biology program officers signed a letter saying this would destroy the merit review system because if people realized that they were getting the verbatim reviews back then they wouldn't be as blunt in reviews or as open in reviews as they would be otherwise. Of course, none of that happened. Reviewers are happy to be blunt and tell people exactly what they think. I think that's the same lesson here, that there is always concern about something new, how that will affect; or overconcern (sic) of how that could affect processes and I think FastLane's a good example of the geosciences community finally coming around. It took a lot of work to get them to come around. Technology can very much concern people, especially—what we always found with this, too—people who complained the most about technology were the

older, most established people in the community who were a little less clear of using computers or using this new internet for something where they'd always done it a different way before.

Yost: Was there anything about those particular fields of science—geoscience, polar science—that had an influence?

Robinson: That would lead to this. No, I don't think there is. I think the key there is; the lesson is that if you get two or three key people in a community who decide that this is an issue that's important to them then they can get other people to buy into that. We had older people in other communities who would write individual letters but it wasn't organized like it was in those two communities. I think it just was up to individuals. I don't think there's anything special about the geosciences community or polar community that would cause that to be the way it is. But it was reflected well in the program officers here, in that some of the last programs that we had in that last year when I did take over, to come in and use FastLane were in the polar sciences and were in the geosciences. So I think there was a feedback loop where the community was concerned so the program officers weren't prone to rush into it, so those were some of the last things to get in.

Yost: Was there a sense or a strategy or need to get buy-in from key people early on and how was that done?

Robinson: Yes. First, the key buy-in was with the people in the building and the PIs. So this was done, I think, very strategically, that FastLane was built one module at a time. The first module was proposal status. And what proposal status did was to tell the PI: has it been reviewed yet, has it been declined, do you expect to receive an award? That gets, immediately, a positive response from the PI. They will stop calling their program officer every day, the way they used to, which then reduces the number of calls program officers would get. That gets a positive response from program officers. So there's a win-win situation by putting in a simple module to get feedback to the PI that the PIs like, the program officers like; so, we just look for things like that where people can see a great benefit. So FastLane was built up module by module at a time, like that.

Yost: That was done strategically with the idea that we need to offer a carrot to the research community to get buy-in?

Robinson: At least what modules were chosen, it was done strategically to see what carrots should be out there. The modules were done just because the whole project was too large to try and do at one time and too risky to try and execute at one time, especially since it was a new way of doing things, the buy-in from the community wouldn't be there. So you had to do it for budgetary reasons, for practical reasons, and for buy-in reasons, a module at a time. That's correct.

Then you wanted to make things easy for the sponsored research offices because the sponsored research offices were the people who were dealing with us all the time and

would be driving the process to integrate it into the universities. For example, when I first came here, no new PIs could be added to the system or users—which was my problem when I went to that workshop—be added to the system at universities or any registered institution; it had to be done at NSF and by just a handful of people for data integrity. Well, it's clear that the universities need access to be able to do that—people switch universities—and that universities care very much about data integrity, too. They want to have the right data in the system. So, being able to eventually push that out to universities was a positive for universities because then they had access to put data in the system and when university people change from university to university or names change, that they could go and address those items and that then took the workload off a handful of people at NSF to free them up to do other things that we needed. So it's that type of thing that you find; is there a way to get the access and usefulness out there to the people that need it and take the burden off of others, as well. So those types of situations that were found.

Then there were other key things such as we actually had; the government had lots of requirements for signatures on things and paper signatures, and that caused all sorts of problems because they weren't moving along as fast as we were. So trying to work out ways that we could go and have our systems lead the change and evolution of the rules that was important; or at least get exceptions for what we were doing. So we had to drive all of those different things because the rest of the government wasn't there with us. We were leading those efforts.

Getting reviewers to buy in to this whole process. You have to remember, it's easy to get PIs to buy into it because if they want to submit a proposal we eventually could tell them for individual programs we could tell them, oh, this is the way you do things. Reviewers were doing us a favor. It took a longer time for us to go and then, later, require reviewers to submit everything electronically. Eventually, they wanted to do it that way but it was a challenge because we had a hook for PIs, we didn't for reviewers. So, that's also important, who's the audience you're depending upon want to do what? If they need to do something to get something from you then it's easy. If they're doing you a favor you have to be careful about what you force them to do.

Yost: I'd like to take a step back to precursors of FastLane. Were you aware of the work done on EXPRES and also EDI in industry; did work done in those areas influence development of FastLane?

Robinson: It did, because Jerry Stuck, who was here, who when I came, was the Deputy Division Director, had done a lot of work along those lines. Again, I got all my [research] funding elsewhere, never had used any of those different systems. The lessons learned from those, how to store information or what formats to put things in or what to think about was used all the time because people with the history of that were here and were involved as part of it. So, while I personally wasn't familiar with it, I would sit down all the time and say what did you do before? What lessons did you learn from that? And then try to apply it to what we were trying to do at the time.

Yost: When you arrived, who were the members of the FastLane team?

Robinson: Well Jerry Stuck had just come back; he was away for a year when I came in. He was the Deputy Director of the division. Carolyn Miller was the Branch Chief; I was a Project Leader and Dan Hofherr was one of the computer specialists, so was Bev Sherman and Aftab Bukhari was a programmer, and Ellen Quaintance was a computer specialist who worked with us. We had Evelyn [Baisey-Thomas] a computer specialist with us as well. I think those were all the government employees and then we had a large team from Compuware, who had been working with the project since it started. So there were a key group of programmers and managers there who had really developed; taken the concepts and put it into action. That was key; having consistent programmers and managers on the contracting side, as well. Without that, and with the current environment where you re-compete lots of different contracts, it would be more challenging to try and do what we did. Sometimes we would compete individual contracts, we had four preferred contractors and sometimes we would get another company in beyond Compuware, actually KPMG, for example, and without the same willingness to work with us and sometimes to work creatively, because that was one of the other things that we did, we worked very creatively, instead of a very rigid environment. When you're in a science environment like this, that sometimes allows you to do that while in much government work you worked in a very rigid structures. So we had to be creative, we had to have flexibility, we had to have a policy office here that worked with us, too, in being able to adapt policies to meet the changing requirement of our electronic version. Those were all key, important things that led to the success that we had.

Yost: Can you speak a bit more about that relationship between policy makers that you had at NSF and the project team?

Robinson: One of the key things was that the [NSF] director bought into a deadline of October 1, 2000 that all proposals would be submitted electronically on that date. And they stuck by it. I believe still to this day, if the director had moved that date, as so many wanted to as we were getting close to that deadline, then it would have taken 2, 3 or 4 more years to get to where we did, but their refusal to move that date was critical to the success; and also to put a commitment and resources toward meeting that date. So, that was the first thing the policy makers needed to do; say yes, we're going to go and move everything over at that date and they didn't sway from that. She actually had a political advisor that came in and who I've gotten to know very well, who advised her that politically this wasn't a good thing to do and you should just change it. But she refused to change it; and she made the right move by sticking by that. That was the most important policy decision.

The other policy decisions to work with us to come up with ways that we could eventually get electronic signatures, rather than having people submit electronically and then signing a piece of paper and sending it in. Because if people see that they're not getting that much benefit from doing something electronically, they'd be less willing to do so. If they have to follow a dual process then that doesn't work well.

The transition from electronic to paper is very interesting. I went over to Beijing and worked with the Natural National Science Foundation of China in 2002. They wanted to know how we went about doing FastLane. So I went over there, worked with them and they said to me that they're just going to tell everyone in the country that on this date they're going to switch from paper to electronic, and they were using the world wide web, they were also allowing people to use disks because rural parts of China didn't have web connections. Every university had to use this one company's software on their end to be able to submit these things. We could never do that here. We could never tell universities that this is the provider you're going to use and you're going to switch over. It is much simpler to do that because when you run a dual process in paper and electronic, you have to do too much emulation of the paper in the electronic otherwise you can't process things the same way on the back end. So the way the Chinese did it—and they were successful, they converted over and they were successful at doing something that really wouldn't have worked in this country—but people can't complain to the government over there, so they have a much different process but it was interesting what they did. I learned a lot of lessons. I came in and one of the; the CAREER program was going on, it was the first time, I think, that Carolyn decided to go on vacation for a week and left me in charge. I didn't realize that—here I am, fairly new here—that the system had broken down for every CAREER deadline, for every year for three years. It almost lasted; it lasted until 4:58 p.m. before the machine shut down for a 5:00 p.m. deadline, Eastern Time. That was a lesson learned, too, in that I had believed the contractors, who said that we've looked at capacity, we've looked at capability and we're fine, they really hadn't. They hadn't looked at any estimates of that, they hadn't really looked into what was needed and when the

opportunity to get some large Sun computer systems because there was some year-end money one year here, I grabbed it right away. We increased our capacity more than an order of magnitude with the introduction of two new multiprocessor Sun machines.

Yost: Do you recall when that was?

Robinson: That would have been in 2000; late 2000; the end of fiscal year 2000 or end of fiscal year 2001. I may be able to find that for you; one or the other. [The systems were purchased at the end of fiscal year 2000 and installed in the first part of 2001.] That was critical too because you can see where the Grants.gov is having problems now is with capacity. You never know when you need the extra capacity so from that point on we didn't need to worry about capacity and that allowed us to do a variety of other things down the road for redundancy, which was critical.

Yost: There was interagency group, were you involved with that and can you talk about that?

Robinson: Which one are you talking about? Are you talking about the interagency group that looked at trying to expand; to have a common grant system, early on?

Yost: Yes, exactly.

Robinson: I was involved in it; in fact, my first day or my second day at NSF was when this was first meeting. This was a group that Jerry Stuck was predominantly involved, with Jean Feldman, who still has our policy shop here. That group really was composed of people from several research agencies, leading out of the contract out in Tyson's that Jerry had gone to for that year, and really looking at different mechanisms to get proposals in. I was deeply involved in that; in fact when Grants.gov, which was e-grants at the time, when the Bush initiative first came in, I brought those people together and proposed a generic FastLane system. If we had to create FastLane again with new technologies, what it would look like. I actually got five agencies together on that, including NASA, who wasn't deeply involved in that interagency effort but NASA, the USDA, CSRES, the Office of Naval Research together, as well, and one other [NIH]; and we proposed a generic system. The interesting thing, when this government-wide initiative came out, they were told they had to get everything working within twelve months. So the people were running it knew actually that this proposal was the best long term way to go but that it would be difficult to have their own servers, be able to do this, so they came up with this very simple e-grants, what became Grants.gov model, that hasn't worked very well. The way they sold it to the community was really Machiavellian, they said, do you want to hold on to your grant proposals or do you want the government to hold on to them, meaning that our system, the web-based system, university sponsored research offices could work on budgets the same time PIs were working on the proposal or if the PI is on travel he could work on it from anywhere. With that other system only one person has the proposal at a time and then you submit it essentially through the web or through email. It's a simple process but it doesn't have the

flexibility or the capabilities that we had designed. Very different model, but they had known that the simpler model would get them there in 12 months; but the thing is it doesn't get them there in 5/6 years down the road, which is where we are now. So I was involved; that was a good effort and the idea, really, with that effort was large universities didn't want to use the web. Large universities wanted to have their own system and do a system to system interface and take the data from their system and send it in to the system at NSF or other places. So that's what they wanted to do, while small colleges liked the web-based system. They didn't want to own their own software, they didn't want to have to buy their own computers to do this, they just wanted something they could hook up to the internet and go that way. So we tried to accommodate both of them. In fact, I had a small group go and put together; and do a system to system interface and we actually got a handful of proposals that way. But by the time we were doing that, Grants.gov was coming around so that started to take over that effort and they never got there. That was much of the emphasis of that interagency group; trying to accommodate the large universities that didn't want the web-based interface. Great idea and I thought we really sold that, but for other reasons, it didn't happen.

Yost: In the early years with the small schools, was there a problem with not having adequate IT infrastructure?

Robinson: Less the IT infrastructure; it wasn't the technical infrastructure, it was the people infrastructure, because all you needed was a computer—many of them had Macs at the time, so we had to make sure it was Mac-compatible because sponsored research

offices, university administration, were getting Macs almost for free so they were flooded. It was the people infrastructure. It was that the small college may have had just one person in the sponsored research office. They didn't have another person to help everyone out and show them here's how you register for the system, here's how you use it, which is why we had to have the outreach programs we did. So at first, our average program started as just; we'd send one person out to do a workshop at a regional grants conference or at a university. We really concentrated on EPSCoR states and minority serving institutions, including a lot of tribal colleges. So we really tried to help them out. Then we even broadened that to do some videoconferencing, early on, and a lot of people didn't have videoconferencing capabilities, at least certainly not in their offices but there'd be some central locations, both to save time and to save money for travel. We tried to reach out to them. We even developed a CD for people on how to use FastLane, and take them through some mock screens and so we tried all sorts of ways, including basic frequently asked questions. Then we had the demo site for the longest time—it's very difficult to keep that up to date with all the other changes we were doing because you'd have the production site, a demonstration site, and a test site, so to keep all three in sync with all the software changes we were doing at the time was a challenge. But the technical infrastructure, all you needed was a website. In fact, what we did one year, we sent Jerry Stuck out to a library because people were asking could anyone go and use this system. So we sent him to a public library and said submit a proposal. Take the file with you on a disk, at that point, and see if you can go and submit it.

The biggest change we made of all was when; for the longest time the biggest problem people had was converting to PDF. You would need software for that; you would need Acrobat software. All of a sudden Acrobat 3 and Acrobat 4 came out and they weren't compatible. If you combined together an Acrobat 3 file and a 4 file anything could happen and our whole system was based on taking individual files created by different people—different PIs with biographical sketches—combining them together. So I knew we needed a way to go and check the files to make sure they had all the fonts embedded, but we needed to make sure they created the PDF files the right way. When we found out the files couldn't be added together we called in the executives from Adobe and got them in a room and said we have more files—at that time we had over a million PDF files—we had more PDF files than anyone else in the country. We had more of these than anyone else. We know more about trying to combine them together than anyone else and we know there are problems here. You need to work with us because we're driving a lot of people at universities buying your software and if we can't find a way to fix this we're going to go to something else and then they're not going to buy your software anymore. We got their attention. They worked on the problems, they worked with developers. We got to the point where we were going to put their software—with their permission—on our system for free but they found solutions and worked out the bugs in the next versions. In the meantime, as I was working out a way to correct this, a small company came to me and said they had a product, maybe you'd be interested in it, that could convert Word, Excel, all sorts of different formats into PDF files and it would insure that the fonts—they didn't know how much I was looking for something like that. It was this small company. Our budget at that point was about a million and a half a year. I would have gladly spent

half that on a product just to do that. They came and said it's \$10,000 plus \$1,000 a month maintenance, and they thought this was a lot. I said, "Great!" I think we could do something like that. We implemented that. That was the biggest boon to all the universities.

Yost: Was there a reaction from Adobe when you implemented that?

Robinson: No, there wasn't. They were happy that I stopped calling them into meetings, and they didn't know why. (Laughs.) But I think they just thought that, well, we got rid of them. But they didn't know that all of a sudden, people didn't need to buy their software. I don't think they took the biggest hit because PDF was becoming the dominant archiving software; but they certainly did take a hit because I heard from a lot of universities happy they didn't have to buy the software, they didn't have to do the conversion. At that point, I had had just a group of people do nothing but correct these PDF problems because the biggest problem we had was with credibility. If the proposal, as submitted by the PI looked different to the reviewer, for example, images were jumbled or equations ended up being jumbled because the fonts weren't embedded. The insidious problem was that it would look right to the PI who was submitting it, because they had the fonts on their computer, but to a reviewer or someone else who didn't have those same fonts on the computer, they would see, well, there's some problem with this image or; and they would decline the proposal or rate the proposal poorly and the proposal would get declined because of that. We couldn't have that; we had to do everything to keep that credibility

there. So this was the biggest plus for the smallest cost and this little company had developed this and thought wow, they're charging \$1,000 a month for maintenance.

Yost: Do you recall the name of the company?

Robinson: I could get that for you; I don't recall it right now [Mira]. It was locally based, I think, in Maryland. They really saved us. I never let on to them how much we depended on them for the product because I didn't want them to suddenly increase their fee but I would have gladly paid ten times what they were charging us.

Yost: You talked about training outside of the PI and sponsored research office community. What about within NSF?

Robinson: That was the biggest thing. At first you had to get buy-in from people. The way we did that; there were actually 3 committees at first. There was a committee called FIRCOM, which was essentially the FastLane steering committee. Then there was another committee called FIIG, FastLane Internal Implementation Group, and those were the people who were at the program officer level and others who were actually looking at the details of what to implement. Then there was a group, FLReps, which were FastLane Representatives from every division in the Foundation; about 55 people on that one. They were all involved in what we were doing; helped with buy-in. The second thing—NSF actually had to come up for the Government Performance and Results Act of 1993; had to come up with goals for the Foundation. One of them was that 100 percent of the people

would be familiar with FastLane and 80 percent of program officers would be trained in it. So we had to come up with training classes for program officers. As we got close to the deadline, which happened to be the same deadline as going fully to FastLane, we had to make sure everyone in the Foundation was oriented into it so we had orientations sessions, too, and pamphlets we were handing out. I literally flew back on September 30th that year, from South Dakota, where I'd been going to give a workshop to a group of 25 tribal colleges that got together. I had found out that there were still 3 people at the Foundation who hadn't been oriented in FastLane, two in the IG's office and one in our legislative affairs office. I tracked them down them down to give them an orientation. I remember going to the person in the legislative affairs office and she said she was too busy. I said we're going to miss this, with almost 1300 people having done FastLane orientation, you're the only who's too busy to do this. So I told her just come down with me to the [NSF deputy] director and you tell him that you're too busy to be oriented in this and she changed her mind. It was a challenge, because there were some people, like the woman in legislative affairs, who said, well, I don't submit proposals, I don't need to know about this. But we wanted everyone to know about it. We had a newsletter internally, but we did have training classes and when you have training classes, you have to train people who are administrative staff and also the people with PhDs who think they know everything and don't want to go to training. So it was really a challenge to design something like that; so we had different classes for different groups of people, depending on what their jobs were. That should have been more of focus for us, looking back, but our focus was so external because we had 250,000 registered outside users and there [were] 1000 people in the building. We had lots of opportunities for them to come up to

speed and we had program officers who were rotating through all the time. Some of those program officers were PIs outside so they understood it when they came in, sometimes a lot better than the program officers who were here and comfortable with the paper process they were doing. The big change for them came when I started the electronic jacket here. The new electronic jacket, as we called it, which was a web-based system, really leveraged the fact that proposals that were coming in electronically and to do all the workflow electronically inside the building.

Yost: When did you start the e- jacket?

Robinson: That was late 2002. There had been an e-jacket before that and it was based in very old software and, again, it had just been static; called jackets, of course, because people kept everything in paper folder, paper jackets. There was a left side to the folder where you put things and a right side to the folder where you put things. The original electronic jacket, that's all it was; it was a static document with a left side and a right side—that's not what we needed. What we needed was a whole different workflow. This was the thing when I came in with FastLane, we had to look at workflow, not just emulating. Same thing here, but let's start it from right from the beginning; let's look at the complete workflow of what we do and do things in a new way—not in a paper-based way but it's electronic, so let's do all electronic. And then we still have problems, today, in that the National Archives still wants things in paper. They have pilot projects going on electronically but they still want things on paper. So at the end, you can print everything out, if out want to, but that's the not going to be the way of the future. The

electronic jacket was only possible because FastLane was there to provide the information that you need to do the workflow electronically.

Yost: In the early days, you mentioned how two problems were overcome; one with server capacity. Were there other challenges in the first few years?

Robinson: There were constantly challenges. The biggest challenge was getting all the programs. It was voluntary, and it was interesting because it went up by about 20 percentage points a year. So each year, over five years, we had about 20 percent proposals come in, then 40 percent, 60 percent, 80 percent, 100 percent; and each one of those was essentially more and more programs going through FastLane. You needed some leaders there. The math and physical sciences director was the leader in that because they said, we're going to do this all early, we're going to do it more than a year early; all of our programs are going to be in. Since they were the largest directorate as far as dollars, it was very important to get their buy-in. So Nat Pitts, who now is retired here, headed the office of integrative activities—been here for 30 years—he was the one who was really in charge of rounding up the people and getting them on board. His office, because it was integrative activities across the Foundation, really led that and helped get people involved in that. Getting math and physical sciences early was important. What I didn't realize until later on in the process was how important Computer Science was. Computer Science was one of the last ones to go and get their proposals in through FastLane because we never got buy-in from the computer sciences inside, as to what we were doing. Really, one of the key things would have been to get them involved early in

the process, ask their opinions—they're computer scientists—for what we were doing. So I certainly did that with the electronic jacket, but since we didn't get their buy-in they were critical of the system. They said, if I were doing it I would have done a better job than that. So, since they were critical of it, they didn't want to be using it. Then we had some complex, oddball programs that really didn't fit in; some of them didn't fit into the policies of the Foundation but no one ever even knew it, or they operated the way they did until you tried to go and say now you have to fit this into the box that we've created, because in a paper process you can get away with all sorts of things if everyone knows what the exceptions are, or allows it. An electronic process, you set up some rules and then we had to be flexible to allow those rules with the policy people, as I mentioned before, to have the exceptions to get the last group of 20 percent in. So that, again, was key, as well; creating the flexibility to do that but sometimes what we had to do is go and say, “hey, do you know this program operates this way? And what do you want to do about it—do you want to keep doing it that way or do you want to fit it into the way the rest of the Foundation's operating?”

Yost: Are there elements of FastLane where that were fundamentally shifted by the work of FIRCOM, where FIRCOM really shifted the way things were headed or changed meaningful elements of FastLane?

Robinson: Once I got there in '98, what I found was that the committee structure was unwieldy, in that you had a couple of groups there. You had a steering committee and then you had an implementation group that sometimes didn't agree and then you were

stuck in the middle. Frankly, when I took over, completely, early in 2000, one of the first things I did was to get rid of those groups. I kept the representatives so that people knew what was going on throughout the Foundation, but I essentially created a new steering committee and then never had them meet. They were all busy, they didn't mind not meeting, and that let me do—especially that last year—get done what I needed to do and I had the confidence of the people involved so that I could get away with that, essentially. At some point, especially if you have a couple of conflicting committees, you're going to upset one or the other and, if you have a committee that doesn't meet but you're getting the work done, no one seems to notice.

Yost: Who made up FIIG and FIRCOM? Can you talk about that?

Robinson: FIRCOM, I remember, was the head of the Office of Information Resource Management, the head of the Office of Budget and Financial Awards Management, BFA, and, I think, there were a couple of the ADs and Nat Pitts, I believe, from the Office of Integrated Activities. So people at the office head—or assistant director level—so one of the highest levels we have here, they didn't meet very often. I heard that they were much more important early on in getting the buy-in and setting the overall structure for what they wanted. This FIIG group met more often—the program officer level, the people who were really involved in things day to day—they did. The problem was there weren't ground rules for what the steering committee's responsibilities were, what the implementation committee's responsibilities were; and what the 55 representatives' responsibilities were. Was it just for them to learn about things? Or give us feedback? Or

actually to suggest changes? And because that structure was never well defined, that's why it didn't work out. I think if they had been well defined as to what their responsibilities were it would have. But, in the end, it was just easier essentially to get rid of the groups that were trying to direct what was going on; especially since what happened was that early in 2000 the senior management got together here and in a meeting about the deadline coming and all but one said it couldn't be done. Only one person—who really didn't know, he was the director of administrative services, his name was Bob Schmitz —said yes we can do it. But he didn't have any idea so what they did was they said, okay, you make sure it gets done. So they moved him from being Division Director of Administrative Services, which was responsible for the building and printing and security guards, and moved him into the Office of Information Resources Management that he reported to, and then they put me in charge of FastLane as the branch chief, and moved the whole branch into there and said, tell us what resources you need, tell us what people you need, and just whatever you need will get done. So they immediately gave me two more people, gave me a larger budget, and so I hired two people quickly and solved the variety of needs that needed to take place, and it ended up going smoothly in the end. But it's interesting that just eight to nine months before that deadline—even all the senior managers thought that it was going to fail. But again, [NSF director] Rita Colwell said we're not changing this deadline, you just figure out what you need to get it done. So that confidence was very important from someone in a leadership position, and it actually was important for Bob Schmitz, who said that, who really didn't have any idea, to take that on. Of course, they told him that ultimately, his head was on the chopping block with it. He had no technical background but here's where he was

good. At that time, I didn't have the skills—I had the technical skills—and he was able to work with people and he would slap people on the back and talk with them, he was able to communicate around the building what we were doing, why we were doing it, and keep everyone happy while I had the technical teams that were going out and doing what needed to be done. That was actually an extremely good combination to have in place.

Yost: You talked about how resources came in and you got more budget. The first couple of years, was budget a problem?

Robinson: Yes, budget was always a severe problem. The person who was heading the Division of Information Systems at that time, Fred Wendling prided himself on never asking for more money, on keeping the budget flat. He thought this looked good. In particular, he hated the web; he was not a supporter of this at all and liked to put his money into client server systems. He thought the web wasn't going anywhere. I remember when I first came here our maintenance contract, where I was on the selection committee, the proposal we selected from Compuware was for a million dollars. They'd never had a million dollar contract. But that's what it cost for a year to go and do this, and he was shocked at that; didn't want to pay for that; his whole budget at that time was about 14 million and that was for all of the IT services and phones throughout the building. He had a large mainframe at that time and a lot of client server systems, which were all the administrative systems. So he didn't want to devote any more money to this experimental thing. What they actually had done was, instead of taking the money out of his budget for a lot of FastLane, they had essentially taxes on all the directorates for it.

They had taken it out of something called program evaluation funds because this was something that supported the programs and was just evaluation. When FastLane became institutionalized, then they couldn't use those funds anymore for program and evaluation because it wasn't just for evaluation, it was actually a production system, so that's when it really started taxing that budget. But yes, he didn't think there was a real future in it; it was his deputy Jerry Stuck who did, and who had been here a long time and helped to develop some of those earlier systems.

Yost: So by using those program evaluation funds it got around charging it as administrative salary or overhead?

Robinson: As salary and expenses; that's correct.

Yost: FastLane, obviously, resulted in some efficiencies. Can you speak about how those were evaluated and factored into decision making about FastLane?

Robinson: Right. One of the clearer efficiencies you could see is between the time that FastLane started at about 20 percent, and by the time we got up to 100 percent, in just those five years, the number of proposals coming into the Foundation went from 30,000 to 45,000. It increased 50 percent in five years with no increase in staff. That gets back to that point that if we had changed that deadline, and waited three or four more years, we would have been so overwhelmed with proposals—much the way we are now with the stimulus funds we just got—people would have burned out. The system would have

collapsed because that 50 percent increase, which was driven by a variety of things. In part, it was probably driven by FastLane, having an electronic system; in part, it was driven by the six month rule we put in place, where we made most of our decisions within six months, meaning that if you have a deadline that's twice a year you now had time to submit a proposal, get it declined, get the reviews back, make changes, and submit it for the next deadline. So, actually, that efficiency increased proposal load. And then economics; it was that time, it was the end of the dot.com boom and, all of a sudden when the economy goes down, the proposal load go up because endowments go down and state funding of universities go down. All of those things factored into it, so it's hard to determine the ease of submitting proposals, what effect that had. But we do know there was a 50 percent increase without any increase in staff and, obviously going back and looking at that without an electronic system, that wouldn't have been possible. Also during that time, you see staffing changes here. You see us going from having a large number of administrative staff and secretarial pools to no more secretarial pool, administrative staff going down, and moving from a model where each program officer coming in had one program assistant who had usually been here for 20 years, to only three program officers for every program assistant. And even that model has changed again, predominantly through the electronic jacket. So you see that changing too, with the electronic systems, that the type of people that we needed at NSF moved from the lower skilled workers to the higher skilled workers because the administrative work was being done by the systems themselves and reducing the simple redundant workloads that we had.

Yost: How was that dealt with? Were there a lot of training programs, with people training and moving up? Were there layoffs or was it done through attrition?

Robinson: There weren't layoffs but here's how some of it happened. When I introduced the electronic jacket, it was again at the time when there were leadership changes in Division of Information Services and elsewhere to a very conservative model, so I knew that I had to go and get that done right away or it wouldn't have been done for years. So we got the electronic jacket started before we thought about human capital and business process. But what happened in 2003 was that NSF had an authorization to double by 2008. So Congress asked the National Science Board to look into what type of agency do you need to be to go from \$5 billion to \$10 billion by 2008? NSF hired Booz Allen Hamilton to come in and do a three-year business analysis from 2003 to 2006 to look at three things: human capital, business process, and information technology, as the three core processes they needed to look at. Then there were five core activities they came up with throughout the Foundation as well, including knowledge management, proposal, the merit review, and so they had five different processes and they looked at what we were doing, the human capital needed, and started something called the administrative function model. That, essentially said, we need to go from having a model where everyone has administrative staff in their divisions, and no one's really looking out for those administrative staff as far as their training, to looking at having a core group of administrative staff that can go anywhere within these directorates, as needed, and they would be managed by someone who was from the administrative side but in a leadership position who can look after the staff, make sure we get the right staff and the training

they need and so on. The other thing we went to, almost immediately, because that's taking time to get there, was to replace the program assistant through attrition with science assistants. What we would have is essentially; program assistants who were predominantly African American women from DC—who were not well educated, but knew NSF very well; they had been here 20 years. They were the ones training the program officers who were coming in as to what to do. As the electronic system developed, many of them didn't have the skill sets to be able to work with the electronic systems and, over time, they retired or they left and were replaced by science assistants who had bachelor's degrees—they were young, used to computers. But the problem is they don't know about NSF and the program officers who were rotators, who were coming in, couldn't learn from them. So we had to beef up our program-manager training actually, because they were losing all the program assistants who knew how to operate things.

And then the third thing was, again, you had this model where you'd have one program officer and one program assistant. Over time, that went to three program officers with one program assistant. Well, the program assistants were getting burned out because reporting to three different people that each expected 100 percent of their time was an impossible situation for them. And, again, you have these people coming in with PhDs that use large words like ad hoc-ing reviews and talked down to the program assistants because they were coming with expectations. We hired program officers here who had this expectation that they were coming in and managing a program, and really, the program officers were the real workforce here, they're expected to do much of the work themselves. That

usually wasn't the way they were recruited or how it was told to them, recruiting them, so that their expectation was different from the reality that they found. So you put all those things together and we learned a lot of different things to get to the point where we are now; trying out the structure where the administrative staff that are flexible to go where needed and our electronic jacket that does much of the workload throughout the foundation. Those are changes that, ideally, would be thought out when you're doing an electronic system, as you develop it. Instead, because of the way things were working and the rather conservative nature of the Foundation, at times, to change, depending on the leadership. The IT actually drove the rest of it—which isn't the ideal way to do it—but was the only way to do it, in this case.

Yost: That leads me to the question about the top leadership at NSF, obviously Neal Lane was supporting you. Can you speak about that and his successors as well?

Robinson: Neal left just before I came in here so I didn't deal with him. I did deal with Rita Colwell and Joe Bordogna who were here. They were both supportive; even though Joe Bordogna was very conservative. He was Deputy Director here for a long time and he was very supportive because he could see how the status quo couldn't be maintained with a staff that over 30 years only increased about 11 percent and that, in the future, it wasn't looking like you were going to get a lot more money for salaries and expenses. The expenses for buildings and computers were growing a lot faster than anything else. So he saw that the only way you could keep the Foundation viable was through the electronic system, so he was very supportive of it. But he was not very supportive of

other changes throughout; he's very conservative in nature. But his support, and Rita Colwell's complete support, both were critical and without that it would have been impossible. Arden Bement and then Kathy Olsen, who came in later as Deputy—she was a program officer here so she understood how program officers needed to operate and, obviously, they could see the systems in a positive way. What we lost was a lot of the creativity. I think some of the key things are you have to maintain the creativity because again, we had some of the conservative people come in to take over the Division of Information Systems, even though Jerry Stuck had taken over for a short period of time and he understood the business process, the way things work, the way things worked at universities. There's no one left in our Division of Information Systems that really understands universities and how they operate, and because they're missing that perspective they really haven't been able to update things and give universities a reason to see improvement to see continuous improvement. That's a critical part of it, so I'm somewhat concerned about losing that. And then, we've tried to bring in CISE in looking at reviews and figuring out recommendations based on a variety of different techniques from basic semantics indexing to other more quantitative methods to link up reviewers to proposals. You can actually take someone who has submitted a proposal, index those proposals, when a new proposal comes in, compare that to the older proposals and find out PIs who would be good reviewers on this new proposal. That's where we need to get to; that's where I see us, hopefully, in two or three years. We're going to start being able to recommend; anyone who submits a proposal is a PI. We need to broaden our reviewer database because the one thing we've learned over time is we're reusing too many reviewers as the proposal load increases and the reviewing load increases. We used to get

about 60 percent of reviewers agreeing to review a proposal if we sent it to them. It had dropped to nearly 50 percent before it started to go up slightly. It seems we're just burning out our reviewer base and we need to broaden that for a variety of reasons. So even just being able to use anyone who's a PI on a proposal to potentially to become a reviewer; in an electronic way, match them up. We could say, for example, we wanted to find reviewers at small colleges; we wanted to find reviewers that are geographically distributed or in particular disciplines. That's something we can do now but it's hard to take advantage of it because everyone has different ideas here and no one has taken the lead in saying let's experiment with this. That's what we did with FastLane sometimes, it was let's experiment with this and see how this works. Right now we don't have anyone doing that but that's the next logical step to take, to help; or when we have proposals coming in to a solicitation, find a sophisticated way to put them together into panels in appropriate ways and make sure we have the right expertise on the panels. Those are all things that are available to us now that we're certainly not taking full advantage of.

Yost: With demand for reviewers escalating and the percentages of those agreeing to review beginning to drop, was there also an issue with the quality and the attention that reviewers were giving to the merit review process?

Robinson: The interesting thing is what we found anecdotally, from the interactive panel system, when we created that, the panel summaries—the quality—started to get better because people were starting to interact. Instead of one panelist writing it and everyone agreeing to it, they started interacting with one another. So we can actually increase the

quality even though the load goes up, if we do it the right way. With reviews, we haven't gone back and looked at that, but the obvious concern is if we have more people reviewing more frequently, the quality is going to be lower but we don't have any data on that. We do have some data on how many people responding to the broader impacts. We used to have not very many people responding to the broader impacts and we really worked on that as one of the two important criteria, so there are ways of concentrating on that and also rejecting proposals that don't include broader impacts in the project summary. We changed the dynamic for people submitting proposals to address broader impacts, so there are ways to affect that, but we haven't looked at the quality of the reviews over time. But it is a concern. There's that concern; there's also—we used to do predominantly ad hoc reviews, mail reviews. Now we've gone predominantly to panels and the reason is just what you're saying; first, it's overuse of reviewers, but secondly, it is easier for program officers that have a lot more proposals to deal with, to get clear recommendations from a panel rather than having to decide themselves. The other concern out of this is workload going from mainly reviews to panels—has the Foundation become more conservative as far as not taking high risk/high reward, because a panel could be more conservative. That's a very important issue and the board [National Science Board] is trying to look into that and may need to address that in the future.

Yost: With FastLane were there mechanisms to regularly get feedback from universities, and if so, what were they?

Robinson: Yes. And one of these ways was actually to send people to do these workshops because by actually being out there and working with people, you can not only see them using the system but they gave you a lot of feedback to their own experiences. Even though I was trying to use videoconferencing to save time and reach more people, it was much more important to get people to go out and visit the universities because that's where you had more time and people would give you the feedback there. We also created a help desk early on, in 1999. The help desk would get calls in, they would also track calls and get ideas from people and they would track systemic issues or systemic questions that people would have. Hey, we're getting a lot of people asking this question, maybe we should change this button or we should put something on this screen to say what to do. That's another thing; we started out with just four people and expanded from there, but it was very important to do. The third thing is we started having annual meetings of a core set of universities. We had a core set of universities, about 16 of them, that would do the testing for us. Hey, we have a new idea or we have a new module, it's on our test site, let us know what you think about it. I actually had a couple of workshops where I brought them in, had *them* give presentations on what they were doing at their universities because of FastLane; also just got them together to brainstorm different ideas, that was important too. So those were three different ways we were doing it. And, of course, we had an email address and people would just send in things and send in suggestions and comments, but it was being continually plugged into the user base that was important for us.

The other thing I did, I monitored a lot of the newsgroups that were out there that were for sponsored research offices and so on. I would go in and just read those, because frequently you would hear people either complain about things or something they would like, so without them even knowing that I was out there doing that, I was using that as an information base as well.

Yost: Are there specific examples of recommendations or insights you received from universities that that led to new implementations with elements of FastLane?

Robinson: Yes. The biggest one was the need for that [PDF] converter. I knew it from a technical standpoint that we wanted that credibility, but I learned from the universities that they needed it from the technical standpoint because they didn't have the capabilities there, both the resources with software and the resources of people to go and do this for the faculty. That was the biggest one that came out and talking about monitoring those news groups, there was a great message from someone at the University of Maryland when we came out with that system that I had bought from that company [Mira] —that night—said "Hallelujah" in capital letters and people wrote in to that. It was interesting because in those newsgroups, you can get feedback immediately that you wouldn't know until days, weeks, months later, going out to universities or even having the help desk relay that information to you. So that was one of the clearest examples of something that met our need as far as credibility but really met a university need that we kept hearing about when we went out to do workshops.

Yost: Was the group of universities that continued to provide feedback, was that the same as the pilot; the 16 or 18 pilot universities [interrupted]

Robinson: Yes, it was. Those were the pilot universities, so they stayed on, volunteering as those testing universities.

Yost: How long were you working directly on FastLane. I don't have a sense of those years.

Robinson: I started in '98, as project leader until the beginning of 2000 when I became Branch Chief, and then in late 2001 I became the Acting Deputy Director there; in 2002 the Senior Advisor for e-government, where I was really trying to push e-grants and Grants.gov toward our model at that time; and then 2003 I left to take over performance assessment and then I wrote the NSF strategic plan. Then I went off as a Brookings Fellow in the Senate and I came back as the Director of this office. So I was really focused solely on FastLane from 1998 really to late 2001, and then at a higher level still involved with it to 2003.

Yost: What changes did you see in those five years, in terms of the response to FastLane?

Robinson: Biggest response was when I came in, there were less than half the proposals coming in through FastLane and there was this big push in the community where I'd say a

large part of the community didn't want to go that way. They were comfortable with what they were doing and I would say the majority of program officers here were in the same boat. They didn't want to go that way, they were going to go kicking and screaming. By 2003, especially with the introduction of the electronic jacket, by that point, they were sold; that was the way business was done and they couldn't envision doing it any other way. If you fast forward all the way to 2009, program officers coming in here and especially the younger ones, this is predominantly what they know and they couldn't imagine going and doing things in paper. So it completely reversed from when I came in 1998 to 2003; from kicking and screaming into it, to I don't know how to do business without it, or what we did before, or never wanting to go back to it. That was the sea change; the pivotal part was 2000, with that deadline and sticking to that deadline.

Yost: How long did it take to implement the electronic jacket?

Robinson: It's still being worked on now and it's turning into this Research.gov that's going to be the back end for other systems. To make sure that we're taking the lead this time so it won't get stuck the way Grants.gov evolved, but I would say it's really from about 2003 – 2005 the main components were completed with it so you had a workable workflow system and now it's has been enhancements to that and incorporates all the bells and whistles into that to do what needs to be done.

Yost: Is it much of a challenge to get new program officers trained on using that and the various elements of FastLane for program management? Most of them have done proposals and reviews...?

Robinson: Most of them have done proposals on it and the idea is to make the system so user friendly on the back end for them that it was easy to learn and so, with the program managers seminar that we have we don't spend time teaching them the electronic systems. We have some classes in it but it's mainly the program assistants that go and take that. The program managers seminar, what we focus them on is scenarios for discussions with panels or dilemmas you come up with and case studies associated with that. So they essentially learn it on the fly, sometimes from their science assistants or their main program assistants. Often it's so user friendly that they're able to learn it off on their own or they go next door and ask the program officer next door to get answers to some questions. Design the system right, the training issues—there are manuals for it, though few read the manuals—getting the system right leads to not needing to have the training in it. The training should be in the expertise and what to do as a content expert, not from how to use the system.

Yost: You mentioned in 1993 that there was a new requirement for setting goals for the Federal Government?

Robinson: Yes, the Government Performance and Results Act [GPRA] that came in the Clinton administration.

Yost: And the initial goals that were set for FastLane that were reached—
implementation and use by the community. That goal setting is done on a regular basis.
So what about subsequent goals for FastLane?

Robinson: Throughout the Foundation, that's correct, that's GPRA. The goals with
FastLane, the earlier goals, were, for example, the percentage of proposals coming in
through FastLane. Other goals were made throughout the Foundation, one was that six-
month goal to go and get 70 percent of proposals accepted or declined within six months,
which FastLane did help drive. The project reports, which came a year later—the
deadline 2001—that was a goal to get them all to come in by 2001. To increase the
percentage of reviewers who were giving us electronic demographic information, which
has always been a problem. We get over 90 percent of the demographic information from
PIs. Only 20 percent of reviewers give us their demographic information. There are two
reasons for that. One, the PIs want to give us up-to-date information on their address,
everything about them because they want us to know where to send the money.
Reviewers don't care. Second thing, there was a flaw in the way that the system was
developed in that PIs can change their address information anytime; reviewers can only
do it when they're reviewing, so if they're reviewing, fine—they go to another institution,
suddenly they can't update their own information. Really, the key all along, we're finally
getting around to it, is combining all that data together—you're not a PI, you're not a
reviewer, you're an individual who has these different roles so that you can update your
information any time. So that was another lesson learned early on of what not to do. But

getting reviewer demographics was a goal that we never reached because there was no hook to getting them to do. For the PIs, if they didn't give us the information, and they didn't have to give us the information under the law, we made them go through a process where they had to really tell us they weren't going to give us the information. It was easier to give the information. It was important to have it, so that was a way we could stay within the law but still make sure we got it from most PIs. We couldn't reach that goal with reviewers because the hook wasn't there; they were volunteering for us so we didn't want to make it difficult. More recently, the goals haven't been with our electronic systems as much as the goals really focused on things we want to accomplish now and the goals that moved for the whole Foundation in assessing performance to the outcomes of research and to do that using information from committees of visitors and having qualitative assessments, using outcomes that come from project reports that are written by program officers. What are the best things that are coming out of that? We get 1,000 of those that get fed into an advisory committee on GPRA Performance Assessment against strategic goals of the Foundation that I helped develop when I wrote the last strategic plan. So that's how we do it now. The focus is less on process—because the process works—and it's more on outcomes, which is where it should be. So you can say FastLane helped us get there. We had to concentrate on process to be able to start to look at outcomes.

Yost: Can you tell me about the key elements of the strategic plan? Other impacts, I assume, were part of it.

Robinson: The strategic plan is something that that GPRA law says you have to do. You have to have a strategic plan, it has to be for five years, and it has to be updated every three years. So we have one for 2006-2011. It has to have strategic goals, so our strategic goals are discovery, learning, research infrastructure, and stewardship. Discovery is essentially the research grants that are out there. The learning is essentially the education grants that are out there. The research infrastructure is some of the instrumentation and major facilities. And the stewardship is the people here, so the salaries that go into that, the FastLane system, the other systems, the IT structure, the buildings, and so on. You find that the largest amount of money goes out into discovery, the research grants, the individual research grants, the researchers throughout the Foundation. Then the next largest piece beyond that ends up being the research infrastructure that's growing. It's growing at a much faster rate than everything else, which is really disconcerting in that we're building wonderful large facilities but they get maintained and operated for 40 years or longer and it's taking a larger percentage of our budget—it's up to 30 percent now. And so the [National Science] Board's really looking at, not only individual projects as they come up, but the whole portfolio because if we keep increasing the percentage going there, research grants to individuals and small groups are going to go down.

Learning crosses over education but we have things like science of learning centers out of our SBE directorate that looks at how people learn, how animals learn, how machines learn. And then the stewardship is something we put in because NSF is always operated with about 5-6 percent of essentially overhead. 94/95 percent of dollars go out the door. How do you keep at that 5-6 percent—FastLane and the electronic jacket? Or how we've been continuing to do that, because without those, we wouldn't be able to get 95 percent

of the dollars out the door. There's just absolutely no way. The proposal load is not only up 50 percent, it's up a lot more, even though we've reduced the number of solicitations and just in the past two months we've had a tremendous increase, estimates are showing to be about 20-30 percent in number of proposals coming in now [with ARRA 'stimulus' funding] that we have \$3 billion dollars that are almost all going into proposals already declined, already in hand, but we have a lot of people submitting proposals. Grants.gov is failing underneath the onslaught of proposals coming in; we're still going along. We're just able to handle that because of, really, work done years ago on increasing that capacity and redundancy. Capacity is just one thing, it was having redundancy so if there is a single point of failure it doesn't shut down everything that you have to do. That's something we started incorporating years ago.

Yost: What do you think are the most important lessons learned from FastLane in terms of the development of cyber infrastructures and human-centered computing?

Robinson: First of all, you need not only experts in computing and in software, you need the content experts, the people who are involved, who are going to be the end users. You need to bring them into the organization or get their input from the start. You need buy-in within your organization if what you're doing; what you're cyber enabling is going to change the way people do work. They need to understand that or give buy-in or both. And the community that's going to be involved, if it's going to be externally facing, needs to also have buy-in to that. So first of all, understanding, communication, buy-in, commitment from the leadership of the organization is critical in this case, and staying

with that commitment, even as the leadership changed, that's another thing. I think the third thing is you have to have the innovation and creativity as part of it; and you have to have the flexibility within that innovation and creativity to be able to think outside the box. If you do that, and you allow that, at the same as insuring that you're maintaining your credibility, the service that you need to provide, then you can come up with something that can be successful. But you need all of those different things: buy-in, understanding, communication, leadership, ingenuity, creativity and innovation. And resources, as well, I mean, they had to commit the resources and find creative ways to provide the resources like that program and evaluation funds. And finally, we've gone back to that again, after years of saying we need to do that within this 5-6 percent; it's grown so much we've been able to go back and—let's say in the past year that those things that are supporting the research directorates here, some funding should come from them for us or centralized cost for the business of doing that research. That will enable us to make sure that we have the resources to expand these ideas, going forward.

Yost: We have now conducted a number of campus visits and gotten perspective from many FastLane users, but we're very early in our interviews with individuals at NSF. Can you suggest questions or topics that I'm not getting at that are important, as well as individuals who would be good for us to interview?

Robinson: Sure. I think you've asked excellent questions; I think you've hit on many of the topics. Some of the things you may want to ask about are how some different things developed, because you have to remember things like the project reporting system. That

was a whole other animal here, it wasn't even considered quite part of FastLane until—and it developed with a different set of user groups. Person to talk about that is Joe Burt, who unfortunately has been out ill for five weeks. He just returned. He's now the head of our human resources department but he was in the Office of Integrated Activities so Joe Burt led that effort of getting together the user group that designed that; would be a very important person to talk to. If you have a chance to talk to Nat Pitts, I do have his contact information; he was the head of our Office of Integrated Activities was important really driving a lot of this. That would be a good person to talk to. Jean Feldman, who heads our policy office and has throughout this whole time period was critical to get her involvement on this and her support and communication. Tom Cooley, who is the chief financial officer here, heads BFA, Business and Financial Awards Management, was very important throughout the process and really getting buy-in from the business and financial side here. So they were all important. Debbie Crawford, deputy in CISE, who was in the director's office for a good portion of the time that FastLane was going into full production would be important; and the deputy SBE, Judy Sunley, who was involved with a lot of it; a lot of what was going on at that time at a high level was also in the director's office around that time. Those are all key people to talk to. Dan Hofherr, who had worked for me, who later took over as the Branch Chief there, is now the Deputy in Division Information Systems would be good to talk to. Those are some of the key people I would talk to, because we developed a review system differently than we developed project reporting system, to focusing on the sponsored projects offices, to the proposal submission—all those things actually developed in different ways so how you'd answer to one of them you may answer others differently, but project reporting was always this

separate item. This coming up now; as we need to think about reporting throughout government and how that's going to be done; and the [ARRA] stimulus funding—now we have to start reporting on how many jobs we're creating and how many jobs we're saving. Everyone's asking how do we go about doing that and having different systems. So some of the questions we've addressed and how we do things keep coming up in a cross-government and more and more people are looking, what can we do now that Grants.gov keeps failing? And we do have USDA using our system for their small external research grants, so there's a lot going on and there's still a lot of people here who were involved. But I think you've asked very good questions, thorough questions throughout and I can't think of anything else to suggest asking.

Yost: Thank you very much for your time.

Robinson: Sure.