Conversation of Deniece Korzekwa and Franz Freibert with Sig Hecker, Paul White and Alla Kassianova

Deniece Korzekwa (DK); Franz Freibert (FF); Sig Hecker (SH); Paul White (PW); Alla Kassianova (AK)

AK: **Deniece and Franz, we do appreciate your coming to share with us your thoughts about scientific collaboration with Russia in plutonium science, So just to start, how long back does your history with the plutonium workshops go? Did you begin it together?**

DK: I think we did begin it together. I took over as the group leader for the Nuclear Materials Science group of Los Alamos National Laboratory (LANL) that does plutonium research in 2009 and the first workshop in which I participated happened the year after that. Luis Morales was the LANL workshop lead and sent a request for participants and talks. So, since I was the new manager, I got new people to participate and Luis eventually decided not to attend. So I went; and it was when Franz went.

FF: I did not go that time.

DK: You did not go that time, right. So I got a group of people; most of them were first timers. I was really excited to go. To be honest, I was very excited to have this collaboration and to talk to the Russian people about what they were doing, and to go to Russia. I was really honored that I was able to go. And that particular workshop was really interesting because it was in Moscow; there were LOTS of people at the workshop. It was my first visit to Russia. I also got to see Moscow State University, because Sig set up a special tour, to see one of their actinide labs. It was a really old-style lab with a very interesting storage of actinides. That was fun. At then we got to meet a lot of really interesting people from both Russian laboratories.

AK: **And you knew that they were coming from Snezhinsk, from Sarov?**

DK: Yes, and people from the Institutes were there too. I think quite a lot of places around Moscow sent participants. We did get to meet a number of people. One of the things that I found frustrating about these workshops is they tended to want to segregate us at most breaks and lunches. Like for coffee break, they would have U.S. people go to one room and then they would have a whole separate room for the Russians. I found that kind of frustrating, to be honest, because you want to have time to talk to them. On the other hand, when we had events like poster sessions, you got a chance to talk to the people and you could talk about science or if it was someone who spoke English then you could talk a little bit more about their home life. If it was somebody who didn't speak English very well or wanted to go through an interpreter, the discussions tended to be most about the conference stuff. [to Franz] And then I guess the first workshop you went on was to Snezhinsk.

FF: Yes. And that was really interesting for me because, as with Deniece, I had never been to Russia before. We flew into Yekaterinburg and then took quite a bumpy bus ride into Snezhinsk. I guess we arrived at about 5:00 in the morning, in the rain and in the dark.

SH: **What year was that?**

FF: It was 2011. And we were joking because we couldn't quite orient ourselves because of the rain and the dark. We were saying, did we travel north or south? We arrived at the back of what we called it - the Turquoise Palace, because of the turquoise coloring on the building. And so we arrived there, got ourselves unpacked and kind of pulled ourselves together. Then they took us on a very nice bus tour of the surrounding city and gave us a historic walk-through. And then we had a nice meal that evening at a local lodge in a birch forest. It was quite nice, and they gave us lots of historic descriptions of settling the place and the involvement of the laboratory in that space.

And then as Deniece was saying about Moscow, same thing, we had our conference meetings at this conference location, and most of the discussions were technical through interpreters. But I found in Snezhinsk a bit more openness – I had the ability to talk a bit more with some of my peers as maybe than what I saw in Sarov.

DK: But they did take the Russian participants away at lunchtime.

FF: That's true.

DK: They took them away in a big bus.

SH: The primary reason for that segregation in Snezhinsk and also in Sarov for the lunches was that the lunches cost them money. And so as far as I'm concerned, they didn't arrange to pay for the Russian participants. So they essentially just either sent them home, or sent them to a different place to eat that was not as expensive as the place that where we were eating. That one was not intentional security segregation. I think it was just a business decision, because then in the evening at a reception and at the actual dinners, they would invite the Russians.

DK: And the dinners were tremendous. The dinner at the local lodge was amazing. They had all this food out there. I am thinking, Oh my goodness, there's so much food! – Well, that was just the appetizers. Then they said, so now the main thing comes. I was totally caught up off guard. I thought, oh heavens. It was so much food, and it was beautiful.

FF: Yes, the presentation was amazing.

DK: Just amazing. And all the toasts, because it was a fairly small group, at that meal. We all sat around one big table so there were lots of toasts.

AK: **So the toast culture still persists.**

DK: Yes, it is very strong. There is a first toast, and then a toast to the women. When we had our last meeting this past September in Baden Baden, to organize the next workshop, we went out to dinner at a restaurant, and I said that maybe we could have a toast. So Vladimir Dremov of Snezhinsk said, well, it is a tradition that the toast be given in Russian and then interpreted for us, so he gave it in Russian and then one of our interpreters interpreted it for us, which is kind of funny because Vladimir of course speaks excellent English. That's because it is tradition; and it was a lovely toast. It was very thoughtful. There are a lot of really neat things about the culture that I enjoyed learning and toasts are part of that culture. You care about words, and you want to say things in beautiful words, whereas sometimes in English we get very nonchalant.

AK: **When it was your and Franz's turn to say a toast, did you enjoy that?**

DK: Yes. After the first time, when I was caught off guard of course, I would actually spend time preparing so that I could have something in my mind for the toast.

AK: **When was the last meeting so far?**

DK: The last meeting was in Sarov; it was maybe the most difficult one. For that trip they put us in this House of Scientists. They took away all our electronics. It was very much like house arrest. We were not allowed anywhere outside of the hotel. There was lots of segregation. Then at the banquet dinner, where we expected to be able to sit with everybody, they actually had signs "This is the Los Alamos National Lab table". We all had to sit there. "This is the Livermore table" for the Livermore participants, etc.

AK: **This sounds so wrong.**

DK: It was very weird. And then they had the loudest music going on so that you could barely talk to the person next to you. It was very weird. That was in 2013.

AK: **So that progressed really quickly. 2011, 2012, …**

DK: In 2012 we met in Cambridge. It was along with the Plutonium Futures conference. So we had Plutonium Futures, and then immediately after that we went to Cambridge – rather, we went to the Welding Institute just right outside of Cambridge and met there. Now it was really fun, because since we were on a neutral territory - we weren't in one of their areas, we could see each other during the breaks and meals. We had a really fun poster session with an open bar so, you know, everybody drinks a little, and they become much more conversational. And that was a really fun interaction. Therefore the next workshop in Sarov was very disappointing. I think a lot of people were very unhappy about it, at least a lot of us in U.S. It was hard to tell with our Russian colleagues because I don't know how much they knew what was happening. That experience was kind of unfortunate because I think that left sour taste with many people about going back to Russia.

AK: **Let me ask if you knew the people before you came to Russia, before you actually met them?**

DK: I did not. I had spent most of my career in uranium and doing uranium processing. I had just started into plutonium research. But many of my LANL colleagues knew the Russian scientists. Obviously, Lidia Timofeeva was one of them. When I mentioned I was going to Russia, they said, oh maybe you'll get to meet her and they obviously knew her very well. Another is Evgeny Kozlov. Vladimir Dremov is an outstanding colleague that I did not meet until I got to Russia. He's very knowledgeable about the whole world, not just the United States, and so he is easy to converse with, partly because he speaks English but he seems to be a lot more knowledgeable about how issues are handled politically in Russia. So I learned a lot about Russian scientists and politics from Vladimir.

AK: **So you were able to talk freely?**

DK: I spent a lot of time talking with Vladimir at a banquet we had in Snezhinsk, because he and I sat next to one another. So we spoke a lot of about common problems we have, like bringing in new young scientists to be able to work at some of these national labs. People don't want to work at the Russian Labs because they have restrictions on travel and they don't get to go anywhere, even though they may get paid a lot more money than working elsewhere.

FF: I would agree with Deniece. It was certainly in Snezhinsk, that meeting where I learned the most, which was fortunate for me because it was my first impression. So it felt very good. Lots of conversations as Deniece was saying. The banquet was an integrated affair, so I had an opportunity to sit with about five peers or even younger individuals and have a really good conversation. Their English was good enough and they could understand my English well enough that we had a good conversation. And I remember one trip we took on a bus to go shopping or something, we actually had some time to talk to them. They came along with, and into town, so we actually could ask them questions like, how often do you have visitors. It's been quite some time, I think, at that point since they had visitors, something like a year.

AK: **Have you known some of their names before?**

FF: So, Lidia Timofeeva I knew before because of Sig's work and I saw her speak at least once at the Plutonium Futures in Albuquerque. And then also she spoke at the Actinides in 2009. I was impressed at that time with her body of work, because it became very obvious as Sig and I had a side conversation after that; I was really kind of blown away by her presentation, because it was so extensive. Same thing with Dremov. I think I met him first at Actinides 2009 and I had a poster session and he and I talked for quite some period of time. Snezhinsk was the same kind of cordial open communication, but after that, not so much. Well, that's not so true with what we were in England and UK. That was very nice, but after that, it was not so easy. I guess we met with them as Deniece was saying at this last Plutonium Futures in Baden Baden and, you know, it still seems they have a genuine interest in maintaining these relationships and continuing as we

can. We had a separate meeting in a room at the hotel and all kind of sat there and had our organizational meeting. It was quite nice that we were trying to figure out how to work through not only the administrative issues but also logistics and what could work from a scheduling standpoint.

DK: That was actually in some ways an encouraging meeting because we're all there in a room and we're trying to figure out how we could all meet again. Even with our restrictions on both sides.

AK: **What are the benefits of these meetings to you? If you were to pitch before whoever funds you, what would you say?**

FF: I can speak to that. As a technical person, you have to recognize the benefits to yourself. As you can imagine, from the work that we do, it's in many respects quite isolating because there aren't many people who work with plutonium on a daily basis. So it's more challenging than other technical areas of work where you can have ongoing conversations with international community. It's much more challenging. You know, the Russians had their own history and their own development of some of their ideas and how these ideas took hold. So you're trying to make comparisons of what they learned compared to what you did. And then also, the contrast is in their challenging ideas - we challenge their ideas; they challenge ours. I think there's often that, when you're doing your presentations, there's often a lot of ongoing and sometimes very extensive conversations or discussions, and sometimes it just gets distracting from the fact that you want to get through what you want to present. Everyone's is quite opinionated. So, I think it's just great to hear things and get interpretations. Lidia Timofeeva has got quite an extensive understanding of metallurgy, and it's very unique, from my perspective. So you have to kind of bounce things off that that interpretation that she has of the metallurgy of the material science, and the like. [to Deniece] And for you, Deniece? There were some uranium discussions.

DK: There have been. I like your idea of challenging your perceptions. One area is the differences in plutonium-gallium phase diagram and we have learned some interesting things by listening to them. It is not necessarily which one is right, because there's obviously some solid science behind each one of them, but how the results work in an overall picture of what they're doing. They've run some really unique clever experiments that have been interesting to see. I found their experiments on critical masses and determining the criticality of different materials really interesting and they have a nice set up for that. I always find really fun to see is how somebody else trying to solve the same problem.

AK: **Playing the devil's advocate, can they just publish it and you learn this from their publications?**

DK: You know, first you have to get the publication – and then get it translated into English. Some of work may have only been published locally in Russian journals that we may or may not have access to. I know much Lidia's research has not been published anywhere. A lot of what

she presents is research that she did quite some time ago. And I think it's fun to discuss the research with them - oh you found this out, what do you think of this? The discussions give you a different idea.

FF: Well, also for me, I'm trying to remember – Alexander Troshev who had just gotten this new instrument in Snezhinsk. He had just gotten a new Netzsch dilatometer; and we had been running one for about a decade at that point. And he was asking me all sorts of questions - technical questions - about the function of it; how to get the best performance out of the device. We even had some email exchanges after the fact, and he had some good successes on it. So you know, it's also satisfying for me to help out a colleague just because of the interactions that we have.

AK: **So what is happening now? How would you define it? Is this kind of fruitful communication stalled? Is it completely out?**

DK: I guess I want to look at it as stalled. The last specific collaboration was in 2013. Since then we've meet at Plutonium Futures in 2014 and 2016 and had some side discussions, but we haven't had focused discussions on the fundamental properties of plutonium. At least my feeling is that both sides very much want to continue the collaboration.

And as far as peers and understanding where people are coming from, the way they look at their national security and we look at our national security, it's nice to keep a collaboration open. I would hate to feel like it's closed. So I think stalled is probably the best I would call it. And I guess I get the feeling that's what they feel as well.

FF: Oh yeah.

AK: **How did they get this feeling? Are you in conversations?**

DK: Yes. We had a planning meeting in Baden Baden including interpreters, even though most people's English was pretty good. One of the goals is to narrow down the focus of these workshops so that we could have a more intense discussions on a topic, because what can tend to happen is everybody wants to talk about their research so we spend most of the time listening to the presentation and not having a lot of time with back and forth.

So we discussed what kind of topics we could have. One of the things that Vladimir said was, it is more important right now to get together and discuss plutonium science. Let's get the ball rolling again and get things moving and then we can once again try to narrow down and discuss certain topics. And he tends to be the spokesman for the whole Russian community at some of these things. But that was kind of the feeling we got - is that it was more important to get together and get things rolling again than to try to be so narrow on the topics that we leave people out. I think this is the idea.

FF: I would like to say something about our other international colleagues. The first time the UK was involved was in 2012 in Cambridge. They hosted it; and I found it to be quite nice because

then they participated in 2013 in Sarov, and in all of the conversation, especially in Baden Baden, certainly was the recognition of value that we all saw in involving a broader international community. So we spoke about the French. And we spoke about other participants as well if they would like. We want to keep it as open as possible.

AK: **What is your ideal vision? What would that be like ideally if you had to set it up?**

DK: My ideal would be an open discussion about the materials. It would probably be hard to achieve due to classification levels. But to talk about what we understand about materials; what are some of the important issues for storing materials; if you're going to do dismantlement, what do you do with the remaining material, how are we going to research issues like aging - there's a lot of common problems for every nation. As the scientists are going to solve these problems, ideally it would be nice if the scientists could work together on it.

AK: **Is that a mix of more applied things, or theory as well?**

FF: It is quite applied. On the other hand, when we're talking radiation damage, then we deal with theoretical models. They're on the cutting edge of the technology of modeling radiation damage. Materials are very complex. Every single time we have some f-electron theory person come in, it's just such a challenging problem that it's nice to get the interpretation and understanding the others have. So yes, we have theory, we have modeling, we have applied - we tend to be applied people with Deniece - we cast plutonium, uranium, so we are familiar with the applications problems as well.

AK: **I'm just wondering on the practical side of it. Is it easier to sell it as having a more theoretical value, because it might be less suspicious from a security viewpoint, or as having an application value because it is useful?**

FF: I would say that certainly during the conversations we have with them, always on the tip of our tongue is awareness where the classification lines are. This isn't a problem in an actinides meeting or Plutonium Futures per se. Certainly we know where the boundaries are and we can work within them to maintain a conversation. Because often it's not the fundamentals that are in question for security, it's more the application.

SH: So if I can just cut in, we didn't even start the Plutonium workshops until like 2000. We had all these other workshops that we discussed - computational modeling, WSSX for weapon safety, others. We didn't do a Plutonium workshop until 2000. The first real interchange on Plutonium came through Boris Litvinov and Evgeny Kozlov in Snezhinsk in 1998 and that led to Lidia Timofeeva. I followed up by inviting Lidia Timofeeva to a conference in Oxford that she and Boris Nadykto attended. It was 1999. So that was the first real exchange of plutonium science and plutonium metallurgy discussions. And then we followed that up with the Plutonium Futures that was held in Santa Fe in 2000. And we were able to get Lidia Timofeeva and Boris Nadykto

to Santa Fe. That led to our writing a paper together. In fact, we were working during this time together on the Plutonium-Gallium phase diagram and the difference of approaches.

And so, as Franz points out, the classification issue - both they and we are keenly aware of what's allowed and what's not allowed. We each stick to that. However, what makes it challenging is their classification guidance is different than ours. So we can talk about things that are fully unclassified, like most of these aspects that Franz mentioned on radiation damage and plutonium ageing. In our world, those are unclassified unless you begin to talk about specific systems and we know not to do that. On their side, that tends to be on the border of classification and so they're more reluctant to talk about that. However, they can talk about some dynamic behavior of plutonium that we can't talk about. And so we're both fully aware of those rules. Nobody crosses that border. So you have to have people who are aware of those issues.

Nevertheless, in spite of the classification restrictions, we have found it enormously useful to discuss what is allowable for reasons Franz said - there's so few people who do this. Even though you have these Actinides conferences as in Japan and many other places, they deal with actinides primarily related to nuclear power, perhaps, nuclear disposition or storage or radioactive waste management related to nuclear power, but not that related to nuclear weapons. And so, from the beginning, we thought that what would be most useful was a bilateral workshop – the U.S., Russia, essentially, the people from the weapons laboratories who do this that can talk to each other. The Russians always wanted to take it in the direction of making it more international, at least to have the name international on these conferences because it made it easier to get approvals through Moscow. And that's especially important now. For a while, the importance of that decreased and the bilateral was OK. And now international again is important because of difficulties between Washington and Moscow. Now they said they want this to be international - the fundamental properties of the actinides. So our experience with going international is the first conference in 1999 in Oxford and it was actually on aging of all materials, actually related mostly to issues of nuclear weapons, but not only nuclear weapons. Then starting in 2000, and the next in 2001, these were bilateral, but the Russians quickly wanted to bring the Brits in and also the Russians had separate collaboration with the French. And they also had some collaboration with AWE, Atomic Weapons Establishment, what was called later the Atomic Weapons Research Establishment.

So the Russians were typically the ones who said, let's either bring in the French or let's bring in the Brits. We did it a few times before 2012 in Cambridge. And in fact, the first Brits, it was here in 2003 in Los Alamos. In 2003 we also had a Plutonium Futures conference in Albuquerque. And then we held the plutonium workshop up here. But the Brits came and the Russians were interested in having the Brits. The French also came to Albuquerque. But the Brits then were invited up to Los Alamos here for this session of the Plutonium science workshop. So the Brits were involved. But a Plutonium Futures was actually in 2008 in France; so then the French were involved as well. So the French and the Brits on and off have had some activity, and the Brits in the later years - 2008 and on, became quite interested.

SH: I just wanted to add that this provides background of the international interactions with the workshops. For the book, Boris Nadykto did a pretty decent job on the Plutonium workshops. One of his earlier drafts had much greater detail and had information on all of the agendas from these different workshops. And I have all of that material in various places. And Dale Nielsen from Livermore who headed the computational science interaction with the Russians early on, he added to this electronic archive the whole series of all of those workshops, all of the agendas, some of the papers - it's all there on the website, it's beautiful. You know, that stuff would be lost to history. And he's brought it all together.

That's the model I'd like to see us use for the Plutonium workshops. Because you two came in later, what is particularly interesting is to get your views as to how you saw this, since you came in late in the game and by that time the relationship had already changed. As you said, the meeting in Sarov, from my perspective, was overburdened by the security people. I just about walked out. The only reason I didn't leave was because of the Russian scientists - because I felt that it would really put them in a very difficult spot. And it was related to security and having a computer in their guest house. Unlike the many, many visits I had made to Sarov before, the visit in 2013 was no longer a pleasant personal experience.

DK: It was very different. I mean you could really feel that.

AK: **May I ask you about any cultural things that you acquired from this interaction? What does this connection mean to you in terms of your world view or your cultural experience? Was it something that was as important to you as the scientific relationship?**

DK: Well, certainly yes for me. I really love other cultures and how people do things and how they perceive them. Ideally, I would like to know ahead of time so I don't insult anyone. I am pretty sure I've probably done my share, but people were very accommodating if I did. Even things like these toasts - we never do toasts in the U.S.; and this is a nice thing to do. One of the other things is gifts. Luckily, I was warned ahead of time about gifts so that we went and got gifts ahead of time to take. And of course, people had gifts for us. But this last time in Baden-Baden I was so surprised - and I should have thought about gifts ahead of time; I just wasn't thinking it through. The Russian colleagues came and brought me gifts and of course I had not bought anything. They remembered that I was going to be there and brought something. You know, that's a nice cultural thing that I think unfortunately we in the U.S. have lost, the courtesies of seeing colleagues.

One of the nice things about Sarov is that is when we were done we went to the town, Boldino, where Pushkin spent a summer. They took whichever Russians wanted to go along as well. So a lot of people from both Sarov and Snezhinsk went, and it was kind of a nice thing to be able to do this with them.

FF: Which was much more relaxed as you could imagine.

DK: Yes, it was nice to be able to go; and they had a fair outside with little booths. I think that was one of the more truly cultural things we've done, because otherwise when you're in a closed city, I have a hard time telling how much of it is normal, for lack of a better word, or whether it's a result of a closed city. Moscow was kind of its own thing, you know - it's a big city. So in Boldino it was nice to go to a small town where you could walk around and see how people are living. There people lived in what I would call more of the Soviet style housing, these big concrete buildings. On the bus back to the airport, we got to sit next to the interpreter. I had a really nice conversation with her about what her life was like in Sarov and what she was striving for. A lot of her decisions were based on quality of life for her children and that was very nice to hear - because the kids were not that old, maybe three and five. She worked extra time so that her son could take special music lessons. I enjoyed talking to her because many of the scientists we interface with are older, it was nice to talk to a younger person. She had spent about a year in the U.S. and she was familiar with the U.S. culture as well. One of the interesting differences from the U.S. is most people live in apartments. They don't have single-family houses which is certainly different from the western U.S. where everybody has their own house, and of course a car.

AK: **Did you go into someone's home?**

DK: No, I wish we could have. We've seen the inside of the scientist's hotel and the inside of the Turquoise Palace.

FF: We had the ability to walk around the grounds. You know, you need some of that. Because you're so focused on plutonium science and discussions and everything, you need a little time to walk around.

DK: Luckily, since we were with Sig, they would take us out for a little activity once in a while.

SH: Yes, we did get out, but only a few times. Most of the time, they said they would appreciate if we stuck to the grounds. So it turns out Deniece is a speed walker. She was out there doing her speed walking probably faster than I was doing my jogging.

DK: We were excited because we thought we'd get go on a trail. It turned out they just took us to a track. I think it's because our minder did not want us to do the trail.

SH: We did get out for a run, it turns out, with Vladimir Dremov. Dremov does not run, he does not exercise, but he is such a good sport that he came along; and his wife told him, that's what you should be doing. I'm not sure he was able to walk for a week after that. But he was a good sport.

DK: I really appreciated that. A lot of them really went out of their way for us to be able to do that.

SH: **So the hospitality was great, right?**

DK: Yeah. I think the situation in Sarov was an anomaly because I think our colleagues felt bad about it too. They weren't really allowed to deal with the conditions either.

SH: **Where did you go shopping in Snezhinsk?**

DK: They took us on a bus.

FF: It was on the plaza where they have a store.

DK: You [Sig] had invited me and Kerri Blobaum to a special meeting, when everybody else went shopping and then, later, Kerri and I went shopping with the security minder. He just took us in his little sedan and we went around to different places, just the three of us. It was nice of the man to do that. I appreciated that he took us out for a special little shopping time. You know, I remember at that meeting we had that nice banquet and they had a little band that was playing. And then at some point, they decided it was time for dancing. All of a sudden, there is Boris Nadykto and he says, do you want to dance? It was just kind of a funny and awkward. That was fun, another culture thing.

FF: I am not much of a dancer, either. But in Sarov, I had had enough and I was like, "OK".

DK: That was a little less formal; and louder.

FF: I guess in some respects the only way you could have a conversation was on that dance floor, when talking face to face with somebody.

DK: But it was really nice – they had planned many dances and singing group as entertainment.

SH: **Deniece, by the time you got there, were there any special aspects related to being a woman in this crowd and dealing with the Russians?**

DK: You know, Tanya Kazakovskaya came up and greeted me and said how nice it was to see a woman doing work in science. And Kerri Blobaum had been attending for a while. But there wasn't a whole lot of deference toward me as a woman. You know, there are the lovely toasts to the women which I appreciate. And I was greeted a lot more with kisses than probably other people. So I didn't feel singled out too much. Lidia Timofeeva of course was breaking barriers. She has had a lot of trials in doing that. I think she should be considered a hero. I wish we had more ways of making scientists heroes.

AK: **Franz, have you had any adventures so far? Of scientific and non-scientific kind?**

FF: Well, I mentioned the dancing in Sarov, for sure.

AK: **How did that happen? Did someone invite you?**

FF: It's usually a Thursday night, and you've had a lot of pressure on you, you have the opportunity to drink some vodka and enjoy. And so I actually danced with the young interpreter and a few others. They would come and grab us and to dance.

DK: It is difficult to say "No".

FF: You give up on saying "No", and think, "what the hell".

SH: **How about the accommodations by the time you got there? I know you talked about house arrest. Accommodations were ok generally?**

DK: OK for me. I'm not picky. In Sarov though, it felt almost prison-like. We had turned all of our electronics in, which we had not quite been expecting, because the last time someone been to Sarov, they were allowed to either keep them or get them back after a day or so. So we had some issues with communications to family or family trying to get hold of us.

FF: My mother in law was very ill at the time. And so for me, I pressed the issue a little bit and said, "I need to make a phone call and you guys need to make it happen". And it was nice, because they eventually did, and it took some pressing. But finally when they did, we also wanted to communicate to everyone else in the laboratory, "Hey, we are out of touch; we just want you to know what we're up to here. If you need to make contact with us, this is how you do that, through the conference coordinator's office". I guess, it was the expectation of at least a shared ability, otherwise we would not have pressed them.

DK: Yeah. At the end of the workshop they took us to the Atomic Museum, and they said, now you can take pictures. Except of course all our cameras had been taken away and not yet returned. I don't know if it was just unfortunate timing or done on purpose, but it was kind of a funny thing.

FF: You know it is true, the spring before, LANL laboratory leaders, Terry Wallace and a number of others, had been there and had taken photos and posted them on their Facebook page. So I was quite astounded when they took our electronics away.

DK: You know the whole thing was so odd. On our way out of town, we finally get our electronics and people are starting to get messages from home. We had this really huge rain in New Mexico and Colorado, do you remember? And so people were talking of being flooded in all kinds of ways. I think it was probably the longest time that we were unable to communicate with family. At least in modern times, because of course now you hardly go five minutes without being able to communicate with somebody. But I would go back to Sarov, even though it was not the best situation.

AK: **So you would go back just for the communication.**

DK: Yes, for the conference.

FF: I was going to say a little bit more, you know we've spoken primarily about our time that we spent their closed cities, but we actually had quite a few sightseeing occasions. Every time we went, we had great tours of the local community whether it be Boldino or whether it be in Moscow. We did actually go to Moscow and then spent the day there - just went to the Red Square, we went to some local places, and in Snezhinsk especially we were going to the cathedral…

DK: Oh, in Yekaterinburg, we had a day - they arranged a day there.

FF: That was great. For me especially, hearing the story of the tsars' family, and then we went out to the forest site and saw all the amazing buildings. They put a wooden structure to the tsar's family on site. This was just amazing.

AK: **I have a strange feeling, sitting here with you. You are people coming from America, and you've been to the cities multiple times. You know so much more about them than I do. I've never set foot in any of them.**

DK: I am hoping to go to St. Petersburg this summer. It will be really fun. I love historic cities. Maybe part of it is because in the U.S., we don't have anywhere near the history.

SH: **Deniece, you said you were so excited the first time you went. Would the younger generation be excited now? How about the young folks you have in your division?**

DK: Yeah. I think so. Paul Tobash, he is young. He went with me on my very first one and was very excited. I don't know whether he's an anomaly or not. He was really excited to go.

PW: **Do you stay in touch with any of your colleagues outside of business arranging the next meeting?**

DK: So far, the colleagues have sent me a Christmas greeting every year, Christmas and New Year's. I am actually friends with them on Facebook but they don't post very much.

SH: **But they do have some Facebook connections?**

DK: Yes. And actually all of them have found me - probably you too [to Franz] – as opposed to the other way around.

FF: I, like Deniece, am in touch with people, especially in Snezhinsk. When they had the meteorite nearby, I think I pulsed a couple of them just to find out how their families were. And same thing, usually around Christmas is when I tend to hear from them you know via Gmail or Facebook or something.

FF: That is one of the things they pretty much send to the personal accounts, not work accounts.

PW: You mentioned you're planning the next meeting, looking ahead. You know, I was remembering, when we were interviewing earlier. One of the most sensitive workshops that we held under the weapons safety security - lot of the details were worked out in a phone call. An interpreter, person-to-person phone call. That way there was a lot of immediate feedback about whether something was possible and could stay on the agenda.

DK: No, we did not have any phone calls. Only person-to-person.

FF: I remember when the S&T agreement was signed…

SH: in September 2013

FF: … we were taking it seriously. We were thinking what we can do to make it work.

DK: Yes, and it was disappointing that that Crimea event happened, really shortly after that.

SH: That was in September 2013 and Crimea was in February of 2014.

DK: Right. Shortly after we had made plans to do research together.

FF: We were actually trying to figure out what can we do. What can we really make happen? I had actually done a presentation on potentials for the decomposition and looking at the Russian phase diagram again. We were seriously trying to come up with ideas.

DK: With ideas that we potentially could have - one lab do a portion of work, and another lab do a different portion of work and then bring the results together. I think that's why it was so disappointing. We were feeling like we were really getting to a place where we could truly work together. Who knows where we are now.

SH: So what you were just describing, you got very much engaged, because the agreement was a big deal. The Russians had wanted to do this for a long time. From a U.S. perspective, it wasn't that important because we thought we could do those things, but the Russians said, no no. They had signed previously a 1-2-3 Agreement for cooperation in nuclear energy. We thought it was good enough, but the Russians said, not for them. For the weapons laboratories you need a specific S&T agreement. So Secretary Moniz and Rosatom chief Kirienko actually worked that out. And so it was a big deal when they signed it in Vienna in September 2013. And then I guess, you got asked by the Washington folks in DOE and NNSA, so we have this agreement; what would you do?

DK: Right. And Los Alamos was the site for materials research.

FF: Yes, Los Alamos was named the center for materials research. So we all had a meeting with Dave Teter who's the division leader for the LANL materials science division and said, let's figure this out. We were game. It was worth it for us to get engaged at that level.

AK: **Did you have time to already discuss these future plans with the Russian counterparts?**

DK: We were expecting it to be signed, in fact, I think it was signed while we were in Sarov.

FF: It was signed right when we were there.

DK: So we did discuss it, with the expectation it will be signed.

FF: Yeah. And we found out a few of them on Research Gate and started having a little bit of a conversation about possibilities.

AK: **And then it just died out?**

FF: Well, I think it kind of became obvious not long afterwards within a couple of months it was not going to work - we can't sustain an interest if the governments aren't willing to support. Because it would have required a lot of government support in that direction. I mean, it was a discussion about how the Russian scientists could come here, work and use your facilities, the same for us there. That would have taken a lot. We were willing to participate, but it would have been quite some effort.

SH: **They had just as much interest as we did?**

FF: I think so.

SH: In particular, there were several facilities here that they would liked to have access to. And then of course we would have access to what they've done and what they know. And then actually do some of these things jointly.

DK: Yes, that was much of the plan - to do joint experiments.

SH: So the good news is, those plans and ideas are still there. They have been generated and then just left.

AK: And the agreement is in place.

SH: So. If one can get back… If we get the young people - on both sides - to want to go and continue this activity. So I think today, you have the job of having to convince the young people why this is so important. In other words, what do the Russians have that would help us in our work. And similarly over there, what the Americans have. Because that's what you talked about before - it is mutually reinforcing. It was beneficial. What you were doing, it was not foreign aid to the Russians.

DK, FF: No no.

DK: And I think that's unfortunate. One of the unfortunate views the U.S. government sometimes has, is that the collaboration is foreign aid to the Russians as opposed to mutual benefit. There is now a recognition on the U.S. side that we have not been bringing new people into plutonium science as much as we should have. We are now doing a lot of hiring into plutonium science. In general, it is young people, we're getting a lot of new people in who are interested in working in plutonium sciences. Certainly the first step, at least on our side, is getting young people working with plutonium and being excited about it.

SH: But then, you saw the same sort of interest over there. They were trying to get their people in the same direction.

DK: One of the nice things about the meeting in Cambridge was we saw several new scientists that we had not seen before. I think mostly they were young female scientists. It was exciting to see that.

SH: That actually included the English.

DK: Yeah that's true. That's absolutely true.

SH: And the French - the French have always done quite well with women in plutonium science going back a long time. The French have more women in plutonium science than the rest of us put together.

AK: **Well, like Sig just said and you agreed, the idea of collaboration is still alive; and the interest in collaboration is still there on both sides. I just want to thank you both for sharing your views.**