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Interview with Frank von Hippel

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Michal Onderco: So, thank you very much for your willingness to be interviewed for this project. Before we met, you made your written memoirs available to me, that I have read. And so the first question may appear a little superfluous, but I ask this to every interviewee, but could you maybe briefly sketch your professional journey to the position where you are today? And why did you choose this path in this field?

Frank von Hippel: I've always been interested in nuclear policy issues, especially nuclear weapons policy. I started, however, as a theoretical physicist in elementary particle physics. And it took me about 10 years post PhD, to find my way into a way that I could work full time on policy. And that took me through two postdocs, University of Chicago, Cornell, and an assistant professorship at Stanford. And then a staff position at Argonne National Laboratory, at that time funded by the Atomic Energy Commission, now the Department of Energy, during which I made my transition mostly, looking before I left, by writing a book with a former graduate student taking a class with me, and then we advised a group of students on the issue of science in the public arena. And we wrote this book, *Advice and Dissent: Scientists in the Political Arena*, and on the way to that an article in Science Magazine called *Public Interest Science*. That led to an invitation to spend a year at the National Research Council of the National Academy of Sciences, during which I made my transition.

Michal Onderco: Why did you decide to leave the career of a pure scientist?

Frank von Hippel: Well, in addition to my interest in policy, which was amplified by the discontent of myself and my students at Stanford, during the Vietnam War and how the US public policy was being managed by the government. In addition to that discontent, I had a very long interest long term interest in nuclear issues, I inherited really, from my grandfather, who was in the Manhattan Project. And from meeting some of his friends, including Niels Bohr.

Michal Onderco: So one of the things that happened around that time, and the discontent around Vietnam at Stanford was also the foundation of the Center for Arms Control and Cooperation, which later became CISAC. Were you involved in those discussions as well?

Frank von Hippel: No, my time at Stanford was before that.

Michal Onderco: So, you then transitioned to this world where you are a scientist who advises policymakers on different issues, and you ended up here at Princeton University. What makes Princeton a suitable place for this sort of work, for you?

Frank von Hippel: Well, there was a ferment within the community more generally. And one of the elements... what was the establishment of a center here, center originally for environmental studies here, by a colleague, Robert Socolow, who's a day younger than me. And had a parallel career, but was faster making this transition himself, he was an assistant professor of theoretical physics at Yale. And he participated in a summer study organized by a senior physicist here, Marvin Goldberger, who later became the president of Caltech, and as a result of his participation in that study, which was of a proposal at the time to build an airport in the Everglades, Goldberger invited him to come here and set up, under the supervision of tenure members of the faculty until he became tenured himself, the Center for Environmental \ Studies. And after my first visibility in the policy arena a result of a study on reactor safety that I organized under the auspices of the American Physical Society, which was also infected by the ferment at the time, Socolow invited me to come here for a year. And then we managed to figure out how for me to stay here.

Michal Onderco: What do you think makes this center different from other similar centers? So, in your memoir, you compare different ways how this center treats postdocs compared to for example, Belfer Center or CISAC. But not focusing only on the role of postdocs, how do you think the center is different from let's say, Belfer Center or from CISAC?

Frank von Hippel: Well, first, I should explain that this program on Science and Global Security at Princeton was created as a result of the university deciding to split up. The original center that I came to, the center which very quickly became the Center for Energy and Environmental Studies from its original origin as a Center for Environmental Studies. And around 2000, the university decided that our original attachment to the university in the engineering school was not optimal, considering what we were involved in. The environmental part ... actually the energy part, which had become Energy-Environment-Climate Change, was attached to the geosciences department. And our nuclear arms control portion of the center, was attached to the School of Public and International Affairs. That is when we physically moved to where you're interviewing me. We were (and are) a small operation, compared to the operations at Harvard and Stanford. We were originally funded by a consortium of small foundations. And so, we didn't think big.

Michal Onderco: Who were your initial funders?

Frank von Hippel: The original funder for our nuclear activities was The Max and Anna Levinson Foundation. I think they provided the original \$25,000 with which I was brought here. There has been inflation since, so that took care of me for a year. The director of that foundation, Sidney Shapiro, liked what I was doing and encouraged us to do more. He found a number of other small foundations in his network and they supported us for our first several years. Unlike Stanford and Harvard, we could not afford 20 postdocs coming in and rolling over annually, we always had one or two. As a result, the relationships with those postdocs were more of a relationship with an apprentice in which we co-authored papers and often the beginning of a longer-term collaboration. When they already were self-propelled, we just intensively advise them on what they were doing. The other difference is that the people who came to us were usually activists with the same kind of impulse as we had: the world was not satisfactory, and we had to change it. In contrast, my impression is that at Stanford and Harvard, most people are on an academic trajectory, or want to move into government.

Michal Onderco: I mean, there is this activist vocation, let's put it this way.

Frank von Hippel: There are of course, also policy activists at Stanford and Harvard...

Michal Onderco: Even within this this program, so, you mentioned that that you tend to draw people who sort of are not satisfied with the state of the world. But that requires at the end of the day still to engage with the governments, right? Do you do you prioritize engagement with the US government over those who want to engage with other governments or...

Frank von Hippel: By happenstance, we had foreign activists find us, and visit us, or in the case of the Soviet Union, we reached out, through other organizations and made connections. So, it I think our network is more international than Harvard and Stanford.

Michal Onderco: I will go a little deeper into this. But at the beginning of every interview, I ask all interviewees: how do they think about the role of nuclear weapons in the world today? So how do you view the role of nuclear weapons in the world today?

Frank von Hippel: I'm less attached to nuclear deterrence as a stabilizing factor in the world, although it is. I am more concerned about the catastrophic consequences if nuclear war breaks out as a result of accident or insanity.

Michal Onderco: And some of the interviewees that I speak to say that it's often difficult to talk about the role of nuclear weapons, because they haven't been used in conflict in 77 years by now. Would you share that view? Or do you think that they matter, even if they are not used in conflict?

Frank von Hippel: Recently, I was talking with my son about this and he reminded me of a way of thinking about it that I taught here. It is sort of the zero-infinity paradox, which is that there's very low probability of a nuclear war, but the consequences, if it happens, could well destroy our global civilization. An example of the zero-infinity paradox was the Fukushima accident. People said: "well there hasn't been a tsunami here in 1000 years." But catastrophic tsunamis were happening there on a 1000-year period. Of course, we don't know, the probability of nuclear war but we have had some narrow escapes.

Michal Onderco: In your memoir, you mentioned you talk about the debate that you had with Edward Teller in the 80s, about the survivability of nuclear war. I don't hear those arguments today, for example, that we don't need to be afraid of nuclear war. Does that mean that, for example, the argument that the impact of nuclear war would be catastrophic, has become extremely broadly subscribed to?

Frank von Hippel: You're right. During the beginning of the Reagan administration, there was talk about "the Soviet Union thinks it can wage and win a nuclear war. We have to develop that same attitude to deter them." I don't know whether we might come back to that frame of mind – perhaps in connection with the confrontation with China over Taiwan. We seem to be preparing for a war with China.

Michal Onderco: So, you mentioned already that this program seems to attract people who are activists and who want to change the world...

Frank von Hippel: Some of them go into government.

Michal Onderco: Some of them go into government and then change the world from within. Where do you think the focus of civil society should be? There are some who think that civil society needs to focus on elimination. There are some who say civil society should better focus on practical steps to decrease nuclear risks, even if it doesn't lead to disarmament and elimination of nuclear weapons. There are others who say: civil society should focus on building normative pressure on governments to do something. In your view, where should be the focus of civil society?

Frank von Hippel: All of the above [laughs]

Michal Onderco: All of the above, okay. But in the world of scarce resources, which of them do you feel to be the one that should have priority?

Frank von Hippel: Well, we sort of have a division of labor here. Zia Mian with whom you have been speaking is working with the governments that are leading this effort to make a difference with the Treaty on the Prohibition of Nuclear Weapons.

Michal Onderco: And I want to come to that later.

Frank von Hippel: And I support that. But I also am looking for intermediate steps. We are not going to get there in one leap. And so I do focus on steps. In the 80s, and the 90s, however, we were really having much more of an impact on government policy than we are now.

Michal Onderco: And by “we”, you mean the scientific community?

Frank von Hippel: I mean the outsiders who were trying to change nuclear weapons policy. And the reason was that there was a citizens’ uprising against nuclear weapons, both in the US and Europe. And when the public gets interested in an issue, then our Congress gets interested in it as well. And our Congress put pressure on the Reagan and Bush administrations, even though initially they were not that interested in arms control. But public pressure forced them to engage. That had happened before in the late 60s, early 70s, with regard to missile defense; and in the late 50s, and early 60s with regard to nuclear testing in the atmosphere. There have been a succession of uprisings. We have not had one since the 80s, however.

Michal Onderco: Why do you think that is the case?

Frank von Hippel: Well, we thought that, with the end of the Cold War, the problem was solved.

Michal Onderco: in your memoir, you said that in the 90s, you had this thinking about what other problem are you going to work on if nuclear is resolved. So first of all, my question is: why did you continue to work on this issue? Why did you continue to constantly find it important? But second is: do you think that if, for example, in the 90s, the interest didn’t decline, we would be in a better place today?

Frank von Hippel: Yes, and in fact, I beat myself up, because I let my attention wander. I remember in 1997 talking to the Commander in Chief of the Strategic Command. He said: “we’re on a glide path toward a low number of nuclear weapons.” I wanted to move faster than he did on that. But I too thought we *were* on a glide path. I did not realize, as I should have, that the demobilization of the outsiders on this issue would leave in charge what Eisenhower called the military-industrial complex. As a result, that the glide path would end short of zero and we’d be on a plateau still with 10,000 nuclear warheads globally. I saw this situation play out in 2010 with the ratification of the New START Treaty, where Obama was forced to commit to the modernization of all our nuclear weapons for another 60 years. There was not at that time pressure for a buildup. But the people left in the field thought that things were fine, and wanted to maintain the situation indefinitely.

Michal Onderco: So if you look at the period in the last 30 years, since the end of the Cold War, what do you feel was the biggest failure are in the field?

Frank von Hippel: I was briefly in the Clinton administration for 18 months during 1993-4. The National Security Council was not interested in what I had to offer. And therefore, I was not involved in nuclear arms control. Already then, the situation was then focused on the care and feeding of the nuclear-weapon complex – not on further downsizing. The Clinton administration did carry through on some of the initiatives of the originally reluctant Bush administration such as the START treaty. The only big new contribution to arms control during the Clinton administration was the Comprehensive Test Ban Treaty and that was driven by Congress.

Michal Onderco: But it never got ratified.

Frank von Hippel: Never got ratified, but nobody's testing, except for North Korea. So, to that extent, it's a success so far. We had to pay a lot to buy the acquiescence of the nuclear weapons labs, however. We gave them something more interesting to do than testing.

Michal Onderco: And you speak about that in your memoir, where you say that, they basically said that if they get as much money for not testing as they get for testing, then they're fine with not testing.

Frank von Hippel: And they've got more money for not testing than they had been receiving for testing.

Michal Onderco: But would you say that there's also some of the failure on the international level? Or was the biggest failure really, on the US national level?

Frank von Hippel: Well, another disappointment was the Conference on Disarmament, where there was an agreement in pursuing a treaty that I had helped revive Congressional and international interest in. The proposal was, after the Comprehensive Test Ban Treaty, to do a Fissile Material Cut-Off Treaty. But there was a stalemate between the US, and Russia and China on the other side – and later a blockade on negotiations by Pakistan, with China behind Pakistan. As a result, the last thing the Conference on Disarmament did was the Comprehensive Test Ban Treaty out in 1996. For the subsequent 30 years, multinational arms control has been paralyzed.

Michal Onderco: So, if you look at the both the failure in the United States and the Conference on Disarmament, who do you think is to blame for this failure?

Frank von Hippel: In the United States, I think it really was a demobilization, and it's hard to know we could have changed that, the demobilization of the public activism. I belong to a local NGO called the Coalition for Peace Action, which was created in in during the time of the Freeze Movement around 1980. And it persists, but it's an aging cohort. And we have less impact with Congress. Internationally, it would have been great if we had had something like the ICAN (International Campaign to Abolish Nuclear Weapons) movement 30 years ago.

Michal Onderco: Do you think that there is something where academics and civil society to be blamed for?

Frank von Hippel: General relaxation, I think. When the public is, is engaged, Congress gets interested, I think it's also true that academics are influenced by what's seen as the issue *du jour*. And right now, and for the last 20 years, what's been building has been concern about climate change.

Michal Onderco: So do you think that the concern about climate change sort of crowded out the concern about nuclear war?

Frank von Hippel: To some extent or at least it attracts people concerned about saving the world, the existential issues. That did drain some energy away.

Michal Onderco: This might be a little controversial question. But if you look at, for example, the activities of ICAN, it's successful in some parts of the world. And it mobilizes, for example in Western Europe, it mobilizes quite a few students. So, in Germany, there are ICAN branches in different university campuses and they organize debates and so on, so forth. The members of Parliament's in different European countries sign the ICAN parliamentary pledge, cities join the Cities Appeal. And in

the United States, there are I think there are four or five members of Congress who have signed the Parliamentary Pledge.

Frank von Hippel: Oh really?

Michal Onderco: I think. Less than 10.

Frank von Hippel: Parliamentary Pledge I should find out about that. That's an ICAN initiative?

Michal Onderco: Yes.

Frank von Hippel: Okay.

Michal Onderco: There are some of the big cities that sign the city's appeal, but not many of them. Why do you think ICAN is comparatively less successful in the US compared to, for example, Western European countries?

Frank von Hippel: Well, it's less successful, I guess, generally, in the weapons states. Although I guess there aren't many democracies among the weapon states. I think it's probably less successful in France, in the UK.

Michal Onderco: in France, probably. In the UK? I don't know.

Frank von Hippel: Of course, some of the leadership came from UK activists. It is a good question and I don't have a full answer. Interestingly, the new humanitarian impact issue that has helped drive the interest in the TPNW is the climate impact. You look at the map, and you'll see that most of the countries that have ratified the treaty are in the southern hemisphere. And is well understood that countries are no longer self-sufficient in the modern economy. We've seen that with the war in Ukraine. Even a relatively small war has disrupted energy and food markets worldwide.

These countries also don't have the propaganda from domestic nuclear weapons establishments about the benefits of being safer because of nuclear weapons. So I see the hope for progression of this movement from the non-nuclear-armed states to the states in NATO, and Japan, South Korea, Australia that are under the US nuclear "umbrella." Those will be the next dominoes to fall. Did Zia speak with you about our new Physicists Coalition for Nuclear Threat Reduction?

Michal Onderco: No.

Frank von Hippel: That's a story we should tell you. It post-dates my memoir, mostly.

Michal Onderco: Is it the group that you mentioned that was doing these lectures with funding from...

Frank von Hippel: Yes. The idea behind it – at least my idea – is to try to recreate some interest amongst members of Congress who are not representing parts of the military industrial complex, i.e. the contractors that build the missiles and the bombers and the states that host the nuclear bases and the nuclear-weapon laboratories. There's a Senate caucus, the ICBM caucus, from five states. Its North Dakota, South Dakota, Montana, Wyoming, and Utah. These are a very well organized lobby for funding on ICBMs.

Michal Onderco: I'm not familiar with the data on the level of the congressional districts, but if you look at it in terms of the Senate and states, almost every state within the US, within the union, has at least some part of its economy somehow connected to nuclear weapons enterprise, right?

Frank von Hippel: Well, that's not quite true. I mean it is true. But it's not politically important in some states. For example, California. California has a \$2 billion a year nuclear weapons lab, at Livermore. It has the Vandenberg Air Force Base, where Minuteman missiles are shot out of the South Pacific to show that they still work. But California is so big, that those issues do not sway the politics, among the members. In the House Armed Service Committee, the people who are already focused on the nuclear arms control agenda are from California. In New Jersey, we have military bases but not much that is nuclear-related. We do have a member of the House Armed Service Committee, Andy Kim, who's there because his district hosts a military base complex, but it is not nuclear. Our Coalition For Peace Action has been reaching out to try to set up a meeting with him, to try to get him more aware of the nuclear arms control agenda. [We did have a very good meeting with him.]

Michal Onderco: So that's an example of the fact that you have this distinguished track record as a scientist, as someone who was in the policy world. Someone who has been really active in providing science-based policy advice, for decades. Does that help you to get the meeting, for example, with a member of Senate?

Frank von Hippel: Indirectly, through our coalition, which has members in his constituency. They tell him, "you represent us, we want to tell you what's on our mind". Then they bring me along, as their expert. That's the strategy we're pursuing.

Michal Onderco: And is the message that is to be transmitted to these members of Senate or, in other cases, members of Congress, is it really to push the government to do more on nuclear arms control? Or is it really this abolitionist move to sort of move away from nuclear deterrence completely?

Frank von Hippel: Well, it's both. We focus incrementally on the most destabilizing weapons systems. Right now, there is a movement to bring back nuclear-armed sea-launched cruise missiles. The Biden administration does not want to develop a new one. Nuclear SLCMs were retired during the Bush Sr. administration. But there are people in the Pentagon and Congress pushing to bring them back. I've been worried about the intercontinental ballistic missiles (ICBMs), infected by my former colleague, Bruce Blair, who was worried about their launch-on-warning posture. But we've lost that fight. I think the new replacement missile will be developed and deployed. I'm now focused on the warheads for that ICBM. The Pentagon wants to make more ICBM warheads. The only rationale for that would be to have the option of increasing the number of warheads from one to three again. That would be counterproductive in my view. So that's one of the issues I'm focusing on now. We've been working with John Garamendi, a Representative from California on the House Armed Services Committee. Unfortunately, now that the leadership in the House has switched to the Republicans, he'll have less influence. But this has to be a long-term effort in any case.

Michal Onderco: I want to switch a little bit to a different type of questions. Of course, as an organization, the program is not standalone. You work with other actors in the field, or you at least interact with them, if not work together. Now, I want to ask you, how do you perceive these other actors? And perhaps since we're today at Princeton University, perhaps the best place to start would be to ask you: how do you view the relative position or how do you perceive the role that other academics play in in the nuclear field when it comes to policy?

Frank von Hippel: It's mixed, there's a range. Some people think we could fight and win a nuclear war. There's an academic pair, Lieber & Press, one at Georgetown University and one Dartmouth, who have

been saying that the US could have a successful nuclear first strike against China or Russia. Stanford probably has the other strongest arms control/nonproliferation group in academia right now. There's a group at the Belfer Center at Harvard that seems to be getting weaker. And then there's the JASON Group, I don't know whether you've heard of that group.

Michal Onderco: The abbreviation doesn't ring...

Frank von Hippel: It's not an abbreviation. It actually came from Jason and the Golden Fleece. It's a group of academics, scientists, and engineers started in 1960 by the same Marvin Goldberger who helped establish Princeton's first Center of Environmental Studies. They are group of consultants – originally mostly physicists – who consult for the Defense Department and the National Nuclear Security Administration (NNSA) inside the Department of Energy, which makes nuclear weapons. I don't know how many people there are, probably 40, 50. who meet for a couple months, every summer in La Jolla on the beach, and work on an agenda agreed with people in the Department of Defense, NNSA and other agencies on subjects of mutual concern. Some of them are interested in arms control. They have done studies on the Science-based Stockpile Stewardship Program which is supposed to maintain confidence that US nuclear warheads remain reliable and safe without test nuclear explosions. Is it working? Do we have confidence? Unfortunately, they mostly don't engage in the public policy debate. Many of them work on nuclear weapons issues because they are technically interesting. As a result, much of their work is invisible to outsiders. Occasionally, there are reports, with unclassified summaries that we can use. And I've been using one of the JASON studies on the longevity of plutonium pits in nuclear weapons. the US has produced only a few since the end of the Cold War in 1989. That causes a lot of anxiety in Congress and the Pentagon. What if the existing pits turned into blue cheese? And so there have been efforts for decades to restart pit production. Some of have been criticizing those efforts as unnecessary. In 2006 Jason put a very useful report saying that they estimated that the longevity of the existing pits is at least a century.

Another issue that I've been involved in is wanting to convert the US nuclear navy from fueling its submarines and aircraft carriers with weapons grade uranium to low enriched uranium. During a period of some government receptivity to this idea, the JASONS were invited to look at our idea and they concluded it could be done.

Michal Onderco: Isn't that what is now applying for the AUKUS submarines?

Frank von Hippel: No, unfortunately not.

Michal Onderco: Are they going with the highly enriched uranium?

Frank von Hippel: The plan is to provide them with a lifetime course of weapons grade uranium, which is a very troublesome precedent. Indeed, the Iranians have said: "we need to produce... highly enriched uranium for our future nuclear-powered ships."

Michal Onderco: So we talked about the academics. How do you view the role of think tanks in the nuclear field?

Frank von Hippel: There is RAND, the original think-tank, which sometimes does interesting work. But mostly the think tanks are providing what I call is "answer analysis". You know what the answer is that your client wants, and you produce the report to support that.

Michal Onderco: So you're not you're not very impressed with them?

Frank von Hippel: No, no, in fact, recently one of the think tanks, the Institute for Defense Analyses was asked by Congress to look at the pros and cons of the US ICBM launch-on-warning posture. Congress asked: "well, there's this debate, can you commission an independent think tank to do a study on this?" The think tank came back and said: "it's great. It contributes to deterrence." They didn't see a great danger of an accident.

Michal Onderco: Which think tank was that?

Frank von Hippel: I'll have to look it up. One of our former students was involved, unfortunately.

Michal Onderco: At least nobody can accuse you of indoctrination then.

Frank von Hippel: Well, no, I wasn't involved with her work.

Michal Onderco: And since you mentioned activism, how do you view the sort of, true activists, the civil society organizations, whether in the United States or broader. You already said that you wish that there was ICAN 30 years ago, do you view the ones who exist in the United States as sort of influential? And do you work with them a lot?

Frank von Hippel: Well, they're struggling but there's certainly a commitment there. Take the Union of Concerned Scientists, which is founded in 1969. There was there was a Day of Concern at a number of universities, starting with MIT, on March 4 1969. It was during the Vietnam War. They were concerned about the use of science. At MIT, one of the follow-up actions was by a group of physicists including Henry Kendall, who had a family foundation. They started up the Union of Concerned Scientists, which is now very large. Kendall's focus was on nuclear weapons and nuclear reactor accidents. And the UCS still does have a small focus on nuclear issues. Probably in the 80-90% of its focus today is on climate change, however. That shows the changing priorities. The Federation of American Scientists, an organization I was very much involved with in the 70s and 80s, was focused on the nuclear arms race during that period. There still is an excellent small group there, that is the most authoritative source of public information about who has what. Recently the FAS grown tremendously because it has received funding from one of the founders of Google to work to place scientists interested in public policy in government.

Michal Onderco: So if you look at the scientists, in natural and hard sciences today, do you think that those who go into the field of nuclear policy go there because they have a mission and passion? For example, a certain goal, let's say nuclear disarmament? Or is it because they want to work on cool problems with cool equipment?

Frank von Hippel: I think it's mostly the latter. In fact, some of us were part of an academic consortium for a while, that was started up by the NNSA. And from the NNSA point of view, the product is graduate students and postdocs who will go into the national labs, and work on nuclear weapons, nuclear non-proliferation, safeguards and things like that.

Michal Onderco: I, five years ago, I did a fellowship at Stanford, and I had another there was a postdoc, and she applied for jobs at the Union of Concerned Scientists, and at Oak Ridge. Which seems to me like to completely polar opposite, but she didn't see it in this way. I'm sure she has a PhD in, in physics, and she thought, well, these are sort of equivalent career paths.

Frank von Hippel: There are major non-proliferation programs at the National Labs. Some people there are helping strengthen the IAEA technically, for example. They also there are also programs on

astrophysics and in neutrino physics where people do fundamental research. And then, some of them are invited to, to work on this very interesting problem of how do nuclear weapons work as part of the stockpile stewardship program. There is a rationale that our nuclear deterrence is responsible for the long peace that we've had between the industrialized countries since the end of World War II. It is long in comparison to the short piece we had between World War One and World War Two, although in the longer perspective, this long peace doesn't look that anomalous.

Michal Onderco: So I want to move on to something else. But before we go there, in your memoir, in the last part, you talk about the development of staff at the program, here at Princeton. And about the fact that you have been hiring physicists with different passions, who are interested in these policy questions. And the question that I want to ask is: how do you choose the people to work at the program? And what are the skills and expertise that you value? And what are the things that you think can be learned?

Frank von Hippel: Well, many people appear on our doorsteps. I remember one, Ed Lyman, who is now with the Union of Concerned Scientists. Ed finished his PhD in pure physics at Cornell and then decided, "I don't think I want to do this as a career." He talked to Kurt Gottfried, who was active in nuclear weapons policy issues, who told him "why don't you go to Princeton and talk to Frank von Hippel: ?" He came to me and said: " I'll work for free."

Michal Onderco: That's always welcome.

Frank von Hippel: And for a couple of months, I think he did. And then we said: "well, we have to pay this guy." And he's become a really important person in our community.

Michal Onderco: So in your memoir, you also talk about many other people who come and sort of did a lot of important contributions. So you, for example, talk about, of course, Zia Mian, whom I'm going to interview later, you mentioned, Sébastien Philippe, and others. When you hired these people, were you expecting that their work would have this kind of contribution, impact?

Frank von Hippel: Zia came as a postdoc. And the expectation was that he would move on in a couple of years. But he didn't. Sébastien actually was a PhD student here, and you don't want to hire your own PhD students. He went to Harvard for a couple of years, and then came back. They both turned out to be very entrepreneurial, in terms of developing their own agendas, evolving their own networks, and doing interesting things, which is exactly what you want.

Zia has become the next generation here. And Sébastien, we hope, will lead the generation after that. always hope that the university will make another faculty position. I think producing academic, peer-reviewed articles was never a priority for Zia. So Zia has "soft money" tenure. He's on the research faculty, not the teaching faculty. But he has an indefinite appointment as long as he or the program can bring in the funding . And Sébastien now has that too. And that's working. We really did suffer a blow when the MacArthur Foundation dropped out of the field. It was our main supporter for decades. In the period I described we were supported by a consortium of small foundations. Then we started to get some money from the Ford Foundation, and then Carnegie and MacArthur, but mostly MacArthur for decades.

Michal Onderco: And so when MacArthur left, how did you cover the gap?

Frank von Hippel: Well, we're really in a transition period. And I think you should ask Zia that question. MacArthur left us a part of money going away. We still are supported by Carnegie, but I think that unless new sources of funding are identified, I don't think we can continue to operate on this anywhere near the scale that we're at now. We'd have to scale back.

Michal Onderco: And you're already pretty small. I mean, you're one floor in a small building.

Frank von Hippel: But we've been smaller. And we could we could become smaller again. And Zia is quite entrepreneurial. And so, I think there may be a way forward for us, again, with multiple funders.

Michal Onderco: Have you ever sought government funding?

Frank von Hippel: We did have that one time of consortium funding, it wasn't very major. And there have been, I think, at least one small grant from the State Department for a particular thing. Alex has been responsible for those. You should interview him. He's different than Zia and me. He does care about the policy side. But he's driven more by an academic interest in applying new technologies, even when maybe the technology is more interesting than the application from my perspective. He's the one who brought in this government funding, which Zia disapproved of, I think. He didn't want to be compromised by that.

Michal Onderco: So do you personally view for example, accepting government funding as a compromising?

Frank von Hippel: No, not as it has been. As long as we're not dependent on it. But occasionally, if there's some like-minded person within inside the administration, who wants to who wants to support some project. I'm not opposed to it. I think Zia is more comprehensively opposed to it.

Michal Onderco: How would you define impact in this field?

Frank von Hippel: Well it varies, depending on the year. Now, we're satisfied with smaller impacts than we were able to achieve in in the 80s and the 90s. But advancing the agenda of nuclear disarmament and nuclear risk reduction, if we can do that.

Michal Onderco: So, if you were to pick one instance where, for example, your own work was unquestionably impactful. What would that be?

Frank von Hippel: The high point for my own career was in the 1980s with Gorbachev. Working with the people around Gorbachev, we really had impact on the nuclear arms race. It was never me alone. I feel I was used by the people around Gorbachev to sort of help them legitimize what they were doing. And give the appearance that there more international support for their agenda than then maybe there was. Are you limited to interviewing academics?

Michal Onderco: No, I'm also talking to civil society and funders.

Frank von Hippel: Is Tom Cochran on your list.

Michal Onderco: No.

Frank von Hippel: He should be.

Michal Onderco: It's actually a name I never heard of. What's his name?

Frank von Hippel: Thomas Cochran. He is retired, but still available. He ran the group working on nuclear weapons policy at the National Resources Defense Council in the 70s, 80s, into the 90s. I give him credit for breaking loose the Comprehensive Test Ban Treaty (CTBT). I think you read a little bit of that story in my memoir. But that was something that Velikov, Gorbachev's technical nuclear arms control adviser enabled and I facilitated... Their first project was monitoring the Semipalatinsk test site by a US group of academic seismologists. That was a real breakthrough because, till then, the Soviets had been paranoid about in-country verification, which was a US requirement. In my view, the demonstration of Soviet openness to unilaterally allow in-country verification revived the interest within Congress and pressure from Congress for a CTBT starting with a halt in US nuclear testing, if other countries, notably Russia halted as well.

Cochran, and Velikov then became partners in follow-on efforts, which were less impactful in terms of long-term impact, but were interesting. One may have actually helped resolve a threat to the bilateral treaty limiting ballistic missile defenses. This was Soviet transparency that they had violated the treaty in their placement of an early-warning radar, which should have been near the border and facing outwards. During that period, I also facilitated discussions on non-offensive defense which I think helped lead to the treaty on conventional arms in Europe.

Michal Onderco: CFE, Conventional Forces in Europe Treaty (CFE).

Frank von Hippel: I introduced German, Danish and UK proponents of non-offensive defense to Soviet analysts, who were interested in the same idea. And we encouraged Gorbachev's unilateral initiative to downsize tremendously Soviet forces in Eastern Europe, which made the CFE possible.

Michal Onderco: How do we know if a certain initiative becomes a success? What's the metric for evaluating success in this field?

Frank von Hippel: Retrospectively...by the way, do you know Matt Evangelista's book?

Michal Onderco: Yes.

Frank von Hippel: Which has a lot of the details of what I'm talking about. Do you mean, how do we know the CFE was a success? Or the Test Ban?

Michal Onderco: No, not necessarily. Well, I mean, so there is a lot of things that... so the Test Ban, for example, was achieved, except for North Korea, nobody's testing. Even though there are periodically these reports that maybe Russians would want to restart, or Chinese, or under the Trump administration there was discussion that the US would want to restart with testing. But the US, for example, never ratified the Test Ban. And some of the people, especially on the more activist side would, say the Test Ban was actually a failure, because the US never ratified it.

Then, for example, the TPNW, the treaty. So there are some who celebrated as an enormous success. Others say it's actually a failure, because the countries that actually do possess nuclear weapons, are not joining the treaty. And so for me the question is sort of more conceptual about how do we actually know when a thing is a success?

Frank von Hippel: Well, these are partial successes. As you say, the CTBT is not nailed down. But it seems to have become a norm, except for North Korea, and even North Korea has periodically declared that it's not going to test anymore. So it's leadership is aware of the norm. The CFE was a great thing in

terms of downsizing the Soviet conventional forces and I wonder if there hadn't been a CFE, whether Ukraine would have done as well, in this war so. But then the CFE is no longer in force.

Michal Onderco: Well, the Russians are non-compliant with it.

Frank von Hippel: But is it still technically in force? I'm not sure whether anyone pays attention to it anymore. But the legacy is that the Soviets destroyed about half their offensive conventional equipment which they are therefore not able to throw into Ukraine. So, it was important even if it's not in force today. I think also that the INF Treaty and the START treaty, and the unilateral reciprocal initiatives of Bush and Gorbachev were and are very important.

Michal Onderco: The Presidential Nuclear Initiatives

Frank von Hippel: Most of the tactical nuclear weapons were destroyed and the global number of nuclear warheads was reduced by a factor of six or so. At least we're that much closer to zero. But it is true that there are no successes forever in policy.

Michal Onderco: Do you think that the case for nuclear disarmament will be easier or more difficult to make after the Ukraine war?

Frank von Hippel: Well, I worry more about China's build-up. It has turned a two-body problem into a much more complex three-body problem.

With regard to the impact of the Ukraine war on the nuclear agenda, Russia's nuclear threats have reminded people that the probability of nuclear war is not zero. And it also was interesting to me that Putin stopped making these nuclear threats. Medvedev and others are still making nuclear threats but Putin stopped after Xi said you shouldn't make nuclear threats and Modi canceled his annual summit with Putin showing that they thought Putin was violating an important norm. And I think also that the threats did revive interest in this issue among the public, which made the threshold for getting our Congress engaged with the issue again easier to pass. But China I really worry about.

Michal Onderco: Why?

Frank von Hippel: Well, it looks like we're preparing for a war with China over Taiwan. There's a new Cold War with China, I think. Neither side thinks it can fight and win nuclear war. At least under Biden, on our side, we don't. But if there's a successor, less grounded, President, that could change. And the losing side, in a war over Taiwan, could resort to nuclear threats. If it were soon, US might think about first strike, maybe a conventional first strike against China's nuclear forces, although I think China is becoming less vulnerable. In fact, I think that is what is in part behind China's build-up: to make a first strike less appealing to the US.

Michal Onderco: In your memoir, you also mentioned that you spent some time of your career working with Chinese scholars. At the time, was this something that you expected to happen? Or is this more of a surprising new development that you didn't expect?

Frank von Hippel: Well, what happened is that some people in the Chinese nuclear establishment were inspired by the US-Soviet lab to lab collaboration. So they opened up. Richard Garwin and I were invited from the US as a result of them opening up to the Italians. And then there was another Chinese connection that I made through Velikov's International Foundation for the Survival and Development of Humanity in Moscow. Xie Xide, the President of Fudan University, was on the board of that

foundation and had a student, Shen Dingli, she sent to me who went back to Fudan to set up an arms control program. Later we had two more Chinese postdocs from the weapons complex. Both became academics. One Zhang Hui, became a researcher at Harvard. The other, Li Bin, went back and started a program at Tsinghua. Li Bin taught at least a couple of marvelous people. One who's a visitor here but actually in Vancouver right now getting his visa renewed: Tong Zhao.

Michal Onderco: So, I want to move to the final part of the interview. This might appear a very complicated question. But if you look 50 years ahead, what do you think the nuclear field is going to look like in 50 years?

Frank von Hippel: If we're still here.

Michal Onderco: And some people find it easier to answer this question if it's posed to them: do you think there still will be nuclear weapons around in 50 years?

Frank von Hippel: I hope not.

Michal Onderco: And what do you think could lead to elimination?

Frank von Hippel: Well, part of it has been technological. I think the downsizing, the Bush-Gorbachev initiative, eliminating tactical nuclear weapons, and the lack of interest in reversing that, was a result of the revolution in military affairs: precision-guided conventional munitions. I think most strategic nuclear weapons are obsolete as well. I guess what I'm struggling with is the question of "can we get rid of nuclear weapons without getting rid of war entirely?" I hope these things will come to be seen as obsolete, very primitive weapons of mass destruction. There are other ways to fight wars that are less threatening to global civilization.

Michal Onderco: So, imagine there is a world without nuclear weapons. How is security in such a world provided for?

Frank von Hippel: This gets back to the question of whether nuclear weapons have prevented war between the industrialized countries. In my view, the industrialized countries have become more vulnerable in many other ways than nuclear. One example I use is Chernobyl. Gorbachev attributed the collapse of the Soviet Union in part to Chernobyl. Chernobyl, in terms of casualties, was infinitesimal compared to what a nuclear war would do. But due to, in a way, exaggerated fear of radioactivity within the population, it had an outsized impact. Well, we have lots of nuclear reactors around and a cruise missile, a group of cruise missiles perhaps, could cause a Chernobyl or Fukushima. So, we have created vulnerabilities.

And now there's hacking. We can be shut down by hackers. The US Colonial oil pipeline on the East Coast was shut down for a couple of weeks. Will we resort to attacking each other in those ways? I hope not, but if we do, the casualties will be less, and less catastrophic. My hope is that all these vulnerabilities will sort of balance out the aggressiveness of dictators and so on.

Michal Onderco: So, there are some who say: well, to be able to move to a world without nuclear weapons, we have to address the fundamental... there needs to be an improvement of relations between, for example, great powers. We basically need to sort of increase trust and more cooperation between states. There are others who say: we can move to a world without nuclear weapons, even if there is no fundamental transformation of relations between great powers, we can move there

because deterrence will be provided by global prompt strike, and conventional weapons, and these other technologies. Where do you fall on this spectrum?

Frank von Hippel: I think I'm closer to the second school. And I think that's what I've been describing.

Michal Onderco: And so are there any particular technologies? I mean, you mentioned cyber and you mentioned cruise missiles. Are there any other particular technologies where you have a lot of hope for?

Frank von Hippel: Well, I'm scared of other technologies. I am really worried about the misuse of these very powerful biotech technologies. In that case, I'm scared of individuals, not so much of countries unleashing plagues on us.

There's also the question of the future democracy, which is, I think, related. We're seeing the belligerence of autocracies with Putin, with Xi and with Modi. So I do worry about the future with all our information and surveillance technologies. The future of democracy is an important factor in the prevention of aggression,.

Michal Onderco: I always end these interviews with the question, is there something I should have asked about and I didn't?

Frank von Hippel: I think it was good.

Michal Onderco: Thank you very much.

Frank von Hippel: My pleasure.