

**HOW CLOSE TO DOOMSDAY? NUCLEAR DANGERS AND STOPPING A NEW
NUCLEAR ARMS RACE**

BERKELEY, CALIFORNIA

Thursday, February 27, 2020

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Ernest J. Moniz and Gov. Jerry Brown at Berkeley

MR. REDDIE: I'm going to call you all to order. My name is Andrew Reddie and I'm Deputy Director of the Nuclear Policy Working Group here on campus. I'd like to welcome everyone to today's discussion about nuclear risks and the opportunities for making a difference, regarding these existential threats. I also want to welcome people joining us through the YouTube live stream. Welcome to the internet. And if you're online, you can follow along using Twitter, using our hashtag #BerkeleyTalksNukes. Also now will be a good time to find the Mentimeter website behind me with your phone. We'll use it as part of the interactive discussion throughout the evening.

So, we're here today thanks to our co-sponsors, the Nuclear Threat Initiative or NTI, UC Berkeley's NPWG, the Nuclear Science and Security Consortium, and UC Berkeley's Department of Nuclear Engineering.

NTI is a nonpartisan, nonprofit global security organization working to reduce nuclear and biological threats imperiling humanity. NTI is based in Washington, D.C. and was founded by Ted Turner and former Senator Sam Nunn. The Nuclear Policy Working Group is seated here at

UC Berkeley, where we meet weekly to create opportunities for undergraduate and graduate students to engage in multidisciplinary research on nuclear security and non-proliferation topics.

Our students come from a variety of backgrounds, including nuclear engineering, political science, public policy, and physics. If you're interested in learning more about our group, you can find more information on our website at npwg.berkeley.edu.

The NSSC, led by program Director Professor Jasmina Vujic and Executive Director Bethany Goldblum, is a UC Berkeley-lead consortium sponsored by the National Nuclear Security Administration, with more than 150 professors, researchers, and students at 7 major universities and 5 national laboratories.

The NSSC contributes to research in nuclear security and proliferation detection while training the next generation of nuclear experts. UC Berkeley's Department of Nuclear Engineering, chaired by Professor Peter Holzmann, has approximately 90 graduate students and 90 undergraduate students in its current cohorts with recent graduates employed in academia, industry, national laboratories, as well as state and federal agencies.

Now to our distinguished panel. Our first panelist this evening needs no introduction. If you live in California, you are deeply familiar with former Governor Jerry Brown. He's here today in a different capacity. Governor Brown serves on NTI's Board and is also Executive Chair of the Bulletin of the Atomic Scientists, which announced the latest doomsday clock in January, with a reading of 100 seconds to midnight. So this is an important discussion.

We also have with us former Secretary of Energy Ernie Moniz, who's Co-Chair and CEO of NTI. He's known for his work on energy innovation, nuclear security, and climate. While leading the Energy Department, Secretary Moniz helped to negotiate the historic Iran nuclear agreement, which I'm sure will be discussed this evening.

Finally, I have the privilege to introduce my colleague Dr. Bethany Goldblum, a research engineer here in the Department of Nuclear Engineering at UC Berkeley, Principal of the NSSC, and founder and director of the Nuclear Policy Working Group here on campus.

Now I'd like to turn it over to Corey Hinderstein, Vice President at the Nuclear Threat Initiative. Before joining NTI, Corey worked at the Department of Energy where she led the Iran Task Force responsible for the development of the Iran nuclear deal. Corey, over to you.

MS. HINDERSTEIN: Thank you, Andrew.

(Applause)

MS. HINDERSTEIN: Okay. First of all, I want to thank all of you for being here. It's really exciting to see such a full room. And I want you to be sure that we're about to put you to work. So, I know that many of you have been to lots of panel discussions and with amazing panelists like these three, we would be really well served to just listen to them talk all night. And we're going to hear a lot from them. But we're also going to hear a lot from you. And so this is the first chance that I want to have you go to menti.com on your phones.

And once you've done that, everything else will run for you. All right. So, I'm going to look for nods. Do people have menti.com open? You're ready to vote? We're ready to hear from you. Excellent.

Before we get started, I do want to first of all thank Andrew and the co-sponsors for putting this session together. And I also want to acknowledge a special participant here tonight. Takashi Tanemori, who is here, is a survivor of the Hiroshima bomb. And so when we are talking about nuclear risks and nuclear threats tonight, I think we will do well to remember his experience and all of those who have experienced not just the threat of nuclear weapons, but the experience of nuclear weapons.

For our interactive session tonight, I want to assure you, although my boss Ernie Moniz might disagree, there are no wrong answers.

(Laughter)

MS. HINDERSTEIN: So, what we're really going to do is use these as prompts for our discussion and have this be a way where we can hear from you as to what you care about and then from our panel on what they think. We're going to start with a test question. This is just to make sure we're warmed up. So, on your phone, you should have had a question appear and it's what is your favorite Berkeley institution? The original Peet's Coffee, Moe's Books, the Cheese Board Collective, or other? And I know not everyone here is from Berkeley. So if you're not from Berkeley and you're not familiar with these, you can choose other. This is really important that you answer this question, even though it seems pretty simple. This is not just how we can find out from you what you care about. It's also so that we can find out how many people are voting. So, in the future I won't wander up and down this aisle waiting for more votes when we have about the amount that we're voting.

All right. Everyone who wanted to vote is voting, anyone who's voting on the live stream is voting. Excellent. Well, it looks like we have a winner with the Cheese Board Collective. Oh, no. Dr. Goldblum, which of these is your favorite?

DR. GOLDBLUM: So, this is a really difficult decision, Corey. But, you know, I've nothing against cheese and I really like Moe's Books, especially their rare book collection. But I think I'm going to have to go with Peet's because coffee is the fuel of an experimental physicist.

(Laughter)

MS. HINDERSTEIN: There you go. Okay. Did anybody answer something other than Peet's that want to tell me what they picked? All right.

SPEAKER: Cal.

MS. HINDERSTEIN: You picked other?

SPEAKER: No, I did. University of California.

MS. HINDERSTEIN: And you said University of Cal? That's a good institution. So, that's exactly how we're going to work tonight. We're going to have the question. We're going to give you all a chance to answer. We're going to hear from our panelists, what they think about the question and we're going to hear from some of you.

So, now that we have our baseline, we're going to dig into today's topic, the light topic of Doomsday. As you heard in the introduction, the Bulletin of the Atomic Scientists -- has everyone heard of the Doomsday Clock? Have you heard of that before? So, they released their 2020 Doomsday Clock. And that clock measures how many minutes to midnight it is.

Now we want you to tell us. How many minutes to midnight do you think it is? So, 1 minute to midnight would be very close to nuclear apocalypse, 60 minutes to midnight would be world peace. And don't answer the way the Bulletin did. Andrew spoiled that for us a little bit by telling us what that answer was, if you remember, if you were listening. But if you think that it's very, very close to Doomsday, then you'll answer 1 minute. And if you think you know what, we're doing all right, then you'll answer a little closer to 60. All right. We have 61 votes. Oh, it's going up, it's going up, 73 votes. That's close to where we were at our baseline. We'll give everybody a few more minutes. 77, 78, 79. Okay.

Last call. Oh, we're still going. This is great. More people wanted to vote on Doomsday than they did on the tradition -- on the Berkeley Institutions. That's good to know. Couple more votes. Okay. Let's see what people said. All right. The average is 17.4 minutes to midnight. So, our room is actually a little more optimistic. But we did have that spike really close to 1. So, this is where -- if we have any statisticians in the room, this is where statistics will tell us a bit of a lie.

Governor Brown, you were involved with, the Bulletin of the Atomic Scientists. As we heard, they came out with 100 seconds to midnight. How did the Bulletin come up with that answer and what do you think about 100 seconds to midnight?

MR. BROWN: Well, they came up with that because the year before they kept it at 2 minutes to midnight. Back decades ago when things were looking pretty good, it was 17 minutes to midnight. That's the longest it has been. Two minutes was the closest it has ever been. So, there was quite a discussion among the scientists. Is anything worse now? And through going back and forth and adding climate, which is part of the feature as well as the potentiality of a nuclear blunder like a false alert that's then responded to and results in a nuclear exchange or perhaps nuclear materials get in the hands of a terrorist. These are real things. And so when people look to that and then adding to that cyber that can manipulate responses that therefore adds to it, they felt that things are worse than they were the year before. And I'd say one more ingredient is the fact that there's very little communication between the two major nuclear powers: Russia and the United States.

So, there's a full bore, I would just list a couple more. There's an arms race going on. There's new weaponry being built in both countries. And the feeling, the antipathy is getting stronger, not weaker. So, no communication, more weapons, and seemingly people aren't too worried about it. So, the scientists and then you've got this climate change, which is getting worse. And then you have in the White House some degree of instability.

So, you add all of that together and they say, we have to advance it to 100 seconds from 2 minutes, from 120 seconds. And I would say the people who didn't want to advance it felt that things were dangerous, very dangerous, but they hadn't gotten that much more dangerous than the year before. But the majority felt definitely things are getting more dangerous. Even though, as you can tell from the vote here, people aren't worried and that's generally true. I would say that's true in the Congress, it's true in many circles that deal with these issues. People aren't worried. But there is another group of people exemplified by former Secretary Defense Bill Perry who are very worried, not that the Russians will intentionally make a first strike bolt out of the blue, but there'll be some kind of a blunder.

Some escalation, a ship in the Black Sea will get buzzed, something or somebody will get shot, and then it will start escalating, and there could be a false indication of some launch, which has happened before. And then it could spiral out of control and that is not a trivial possibility. And in the face of that, the only real response is aggressive rhetoric on nuclear building and tearing up agreements, and the one that we have the last one, the New START, we don't yet know where the president is on that. So, you put all of that together, we're in a very dangerous situation. And there doesn't appear from the presidential candidates or from the White House much inclination to tackle the problem.

MS. HINDERSTEIN: So, we heard about a number of different issues there. Everything from increased cyber threats to increased risk of miscalculation, the addition of climate change risks. Secretary Moniz, should people be more worried?

DR. MONIZ: Absolutely. And just to pick up on one of Jerry's last points. You know, this is an appeal to the audience. We are obviously in a presidential election year. And it's fairly ironic that -- understandably, but ironic that the debate is almost exclusively around kitchen table issues. And of course people are concerned about kitchen table issues. But it's also true that the president has limited tools for many of these kitchen table issues whereas the president has the unique position with regard to nuclear weapons of being the only person who can make decisions on the utilization of nuclear weapons. That unique presidential responsibility invested in one person, a person who could be confronted with the most difficult decision you could imagine with about 10 minutes to respond is hardly questioned upon whether he or she has a frame of reference for addressing these issues.

So, if there's any issue we should be asking the candidates for and elected officials about, it is exactly that. How would you exercise your required authorities when no one else has those authorities in a crisis situation? We do not know the answer to that question for the candidates or frankly our current elected officials.

MS. HINDERSTEIN: So, let's hear from one of you, somebody who said somewhere in the 1 to 3 range, we have a little spike there close to midnight. Did somebody who answered in that range want to explain why, what went into your thinking?

MR. PHILIP: Christopher Philip from the Climate Institute in Washington. I'm biasing my response, which is a 1 toward the helmsmen, the person who's in charge, who has got the wheelhouse for our military and his stability. Governor Brown mentioned that there are cyber

threats and accidental things and that's a technological fault flaw that we have facing us, but there's also the human flaw. And for that reason, yeah, I put it as close as I could. Thank you.

MS. HINDERSTEIN: So, we have to trust in decision-making and leadership. And somebody who answered maybe 30 minutes or more want to say why you thought that that was where we should be? We're going to let you off the hook on this one. Like I said, no wrong answers.

SPEAKER: Hopefully not. So I put it at 40. I think there's a lot of ambiguity about where a leader stands and offering to not be a first use policy. And so I think that leaves a lot of guesswork into this really important subject matter that shouldn't be guesswork.

MS. HINDERSTEIN: So, we need more clarity on some of these things to even know better where the line should be. Did a good job. Governor Brown, please.

MR. BROWN: I would add that the risk of a nuclear blunder is not just theoretical. During the Cuban Missile Crisis, we know these are facts that the Joint Chiefs of Staff and the Secretary of State, Dean Rusk, recommended that the missile emplacements in Cuba be bombed. Those emplacements had nuclear tipped weapons. And the colonel who I've spoken to said he was fully authorized to fire. If he had been attacked and he had fired on Miami and there were some nuclear explosion, we probably would have had an exchange and we might not be here. It could have been the Armageddon right there. So, there was a second one. There were the torpedoes, there was a submarine that our submarines during the Cuban blockade were dropping charges into the water to make the submarine surface. Those submarines had nuclear torpedoes. The American government didn't know that.

So, not only did John Kennedy stand against the smartest people in the room, namely the Joint Chiefs of Staff, but he didn't even know about this other thing that was going on in the seas, in the oceans there. And when asked about it I think afterwards, McNamara was asked, how did we make it? Luck. And as we know, luck runs out.

MS. HINDERSTEIN: Secretary Moniz, you have the final word on this point.

DR. MONIZ: First, adding to Jerry's point, that was not the only time that luck came into save the day on both sides, on both the American and the Soviet sides. But what I was going to say was in terms of the 30 minutes, 1 minute, et cetera. Of course, we are dealing here and then the Doomsday Clock as Governor Brown said, with at least two existential issues are being intertwined; climate and nuclear weapons. And to that, by the way, I would add my personal

third existential issue of the risks of misuse of advanced biological science and technology. But my real point is just to say that we have to understand that, I think as Jerry said, the reset of the clock was about directional in terms of risks being higher overall.

But clearly the nature of the risks in the nuclear domain versus say climate are quite different. In the nuclear domain, it's obviously the risk of a catastrophic incident that could take place for the wrong reasons, although it's always the wrong reasons over a very, very short time. Whereas climate, I would classify as a slow-motion train wreck. We see it coming, we know it's coming, it's coming over a long period of time. And that's what's being captured. I think the idea is that we're not going in the right direction.

MS. HINDERSTEIN: Thank you for the reminder. I mean, the clock is not absolute. But it's a good tool for us to focus on some of these issues and talk about, are we going in the right direction, are we going in the wrong direction?

Let's move on to the next question. This one is going to rely on your creativity. We're going to build a word cloud. So, other than the word Doomsday, because I think that's an easy one given the title of our session: When you think about nuclear weapons risks in 2020, and we've already heard about some of the fundamental issues, what word comes to mind? So, you can put in anything here. What word comes to mind when you think about nuclear risks?

Do we have any optimism in the room? Is it only pessimism? Is there room for us to educate ourselves? And the panel, I'm going to ask all three of you for your word in a minute. So be thinking about it. When creativity is involved, it takes a little bit of extra time. So, we're at 60 votes. We were over 90 last time. Let's see if we can get there. See if anybody on our live stream is weighing in. Up to 70. Okay. If it's 2 words, but they go together. Sure.

DR. MONIZ: Hyphen.

MS. HINDERSTEIN: Hyphens, they -- those count. You're not going to be kicked out. We're up to 80. All right. We'll give you about 10 more seconds to put in your word. I'm going to do this in a little bit of a backward fashion, but before we show the word cloud, I'm going to ask the panel. Dr. Goldblum, what would your word be and why?

DR. GOLDBLUM: I think I'll go with great power of competition particularly in the context of U.S.-Russia relations. So, the United States and Russia together hold over 90 percent of the world's nuclear weapons. And so whether by accident or aggression, if a deterioration of relations leads to a nuclear exchange, this would be devastating. The risk is defined as the

probability of an event multiplied by the consequences. And the consequences of nuclear exchange between the U.S. and Russia would be significant. And therefore it's a high-risk scenario.

MS. HINDERSTEIN: So, great power competition, but focused on U.S. and Russia. Governor Brown, what would your word be?

MR. BROWN: Since you're only giving me one, I'll give it to you -- end.

MS. HINDERSTEIN: End, yeah.

MR. BROWN: End of us or end of the arms race.

MS. HINDERSTEIN: That's our choice.

MR. BROWN: That's our choice.

MS. HINDERSTEIN: Yeah. Secretary Moniz?

DR. MONIZ: Work.

MS. HINDERSTEIN: Work.

DR. MONIZ: Because that's our approach to everything.

MS. HINDERSTEIN: Yeah.

DR. MONIZ: We have these big risks, we know steps that helped to ameliorate the risk. But you don't make progress by just sitting around, you'll work at it.

MS. HINDERSTEIN: Yeah, we can't snap our fingers on this one.

DR. MONIZ: Yeah. So, frankly whether it's climate or the nuclear weapons risk or the bio risks that I mentioned earlier, in all cases we got a lot of steps that we the people need to move forward. It includes getting accountability of elected officials. But in the end, it's work.

MS. HINDERSTEIN: Work.

DR. MONIZ: Work at it.

MS. HINDERSTEIN: I'm glad to know, I'll have a job for a while.

DR. MONIZ: You have a permanent employment. Right.

MS. HINDERSTEIN: Well, actually, I hope not. Let's work ourselves out of a job. Let's see what our word cloud looks like?

(Laughter)

MS. HINDERSTEIN: All right. So, we actually have a good mix here. Now, for people who haven't worked with a word cloud before, the size of the word indicates how often it was used, how often it was offered. And we actually have a lot of diversity in here. So, some of our largest ones; escalation, apocalypse, accident, Iran, miscalculation, fallout.

MR. BROWN: There's a bigger one.

MS. HINDERSTEIN: And we have Trump in the middle. So, when we think about these words, did anyone who offered one of those; accident, apocalypse, miscalculation, escalation. There are a lot of words that have to do with kind of the process by which we find ourselves in a situation, through accident, through escalation, through miscalculation. Did anyone who answered one of those want to say anything about that?

I'm going to start shoving the microphone in people's faces. Okay. Great. Can you pass that down? I'm sorry.

MR. BROWN: I actually put up a derelict.

MS. HINDERSTEIN: Okay. Same, that's right -- the same theme, yeah.

MR. BROWN: Because the newest nuclear weapon we have kicking around was built in the mid-'80s with the finest of technology that was tried and true for the '70s. We couldn't rebuild a nuclear weapons program now if we tried. So, the fact any of it works is remarkable. It may break at any moment.

MS. HINDERSTEIN: So, you're really talking about the system, the infrastructure, the knowledge base, to manage the weapons and the risks that come with them. There's another

interesting kind of word that I see up here; helpless, chaos, uncertainty, fear. I think that says something about how people feel when it comes to addressing nuclear risks, right? What can we do, actually we will get there a little bit later in our conversation. But there are some other kind of solution words; treaties. Children, that's a hopeful word. I mean, why would we want to make the world better, right? Unnecessary.

So, there are a lot of kind of emotion words that come up with nuclear weapons. Did anybody answer something that was a little bit more on that emotional scale that might be -- they might be willing to say why they said that and how they come to that? Please.

MR. BROWN: I wrote children.

MS. HINDERSTEIN: Children, okay.

MR. BROWN: And it is what immediately came to mind. I know so many young people who are saying, "I'm not going to have children." And I have children and Lord only knows. And that's being true throughout my lifetime, but the depth of the feeling that I get among young people that they just don't want to bring children into the world, I find profound and quite disturbing.

MS. HINDERSTEIN: Did anybody else want to say anything about the word they used or maybe they see a word up here that they think "Ah, I should have said that one?" So, one I haven't seized on, please.

SPEAKER: Well, I didn't get my word up there because I was trying to put words in for the whole row.

MS. HINDERSTEIN: Well, we appreciate that. Thank you.

SPEAKER: My word was probability.

MS. HINDERSTEIN: Can you say something about that?

SPEAKER: There are so many probabilities and it's just as a matter of time, we cannot calculate them all. Just in the same way that the atomic bomb is the genie out of the bottle, we just cannot really account for the totality of the potentialities that can happen.

MS. HINDERSTEIN: Yes. So, anything with that unless it has a zero probability, we have to be thinking about it and working towards reducing that as much as possible.

Does this display of words, does it surprise any of you? Is this what you would have expected to see, these kinds of words?

DR. MONIZ: I think it's interesting that there are some of these place-based words like Iran and North Korea.

MS. HINDERSTEIN: Yeah, Pyongyang, yeah. Middle East.

DR. MONIZ: North Korea, Middle East.

MS. HINDERSTEIN: Yeah. So, we've got some focus to our concerns. Please.

MR. PHILIP: The word divertitude (phonetic) up there, is it meant to express gratitude for the fact that a panel like this exists because this is a subject that is widely diverted from our attention. We're on a Titanic facing an iceberg and we're talking about what are we going to have for dinner? What kind of music should we listen to? So, this panel is doing a service to humanity and that's why I think diversion from the topic is what we do not need anymore. Thank you.

MS. HINDERSTEIN: I should have come to you last. That was a good point to end on. But it's true. We have three people here who are not only extremely well educated, but very active and engaged on these issues and we are lucky to have people like this working on these issues. Yes.

SPEAKER: Can I just suggest that Mr. Tanemori, since he's a survivor of the bombing of Hiroshima, he has a very unusual perspective on this question.

MS. HINDERSTEIN: Of course.

SPEAKER: If he'd be willing to share.

MS. HINDERSTEIN: Sure. What was your word, sir?

MR. TANEMORI: One thing I'd like to say that many of us, I think that 99.9 percent of folks here this evening, have never been to Hiroshima or Nagasaki on that morning. So,

whatever the intellectual knowledge, the research we have done, and I am so grateful, all the possibility of a scientific knowledge. But I just simply say, they're all a theory, it's still theory. And the impact with the Hiroshima bombing, as a survivor of Hiroshima, I could only say my own experience. I cannot compare with any others, but how much impacted my physical life, mental, emotional, psychological, also spiritual life. But through the pathway of Hiroshima, perhaps I may be the only one publicly declared Mr. President Truman, you bombed Hiroshima, destroyed my family, took my beloved -- my Samurai fathers. But I forgive you. I am forgiving you.

The question is, what can we do? The nuclear bomb, the genie is out of the bottle, we cannot put it back. So, what can we do? And the question is, I believe it's not so much what did happen, how horrific was the event of Hiroshima and Nagasaki. The possibility of all the nuclear and bomb issues between Soviet, China, and North Korea, the United States, Iran everything, yes, but I think we need to find out why, the cause of this human conflict.

And with this I'd like to say September 22, 1945 the former five-star General Douglas MacArthur, he gave the last speech before the Congress. He said, after 52 years of professional soldier service, we have done so many different ways, including negotiation dialogue to resolve the human conflict, since human civilization. But he said, the problem is not the physical aspect, it is the heart, the spirit. Until we come to face the reality, we need to reserve the -- deal with the human heart and the soul. Otherwise you can never, never, never come to solving the human conflict. That was Douglas MacArthur, September 22, 1945, and I say, yeah, Douglas MacArthur. He is my hero. Thank you.

MS. HINDERSTEIN: Thank you so much. I think you said a word that's almost more powerful than anything up here, which is forgiveness, but also how do we learn, how do we make sure it doesn't happen again, how do we think about conflict in nuclear weapons are a weapon of conflict. Ideally.

SPEAKER: There's North Star.

MS. HINDERSTEIN: yeah, North Star, your word was North Star.

MR. TANEMORI: North Star shines brightest in the darkest night.

MS. HINDERSTEIN: Shines brightest in the darkest night.

MR. TANEMORI: Yeah. I'm so grateful that I'm living with such a conflict period and I'm so grateful that the path to Hiroshima brought me to this very present, I'm hearing from Jerry Brown, the Governor, the greatest state of the nation. Thank you so much. But it is a pathway, Hiroshima brought me here. It's my understanding that divine forgiveness is the only solution to human conflict. Thank you.

MS. HINDERSTEIN: Thank you.

DR. MONIZ: Corey, let me just add that following on those very important comments. When I visited Hiroshima just over a year ago it was really important to remember this iconic photograph taken maybe three weeks after the bombing of a complete rubble field in Hiroshima, with a new green sprout coming, growing out of it. And that was a very, very profound photograph.

MS. HINDERSTEIN: Thank you for adding that. So, we've talked about threats, we've talked about fear--

MR. BROWN: Let me add something since the question of forgiveness has been brought up and there's maybe an analogous virtue called humility. And in order to have some kind of negotiation or understanding, it's necessary that both sides understand each other in some way, at some level. And today, if you look at the discussions of most of our candidates and discussion in the Congress or even in the media, it's that the other people are all wrong. Russians are all wrong and the Chinese are all wrong. But that's a non-starter.

So, if you really look back at the history, it's a real tangle. America did certain things the Russians didn't like. Russians are doing things that we find very objectionable. And it goes back and forth and it's all tangled. So, even to have a discussion -- who's going to have a discussion? Is it Putin and Trump? Is it the Foreign Ministers? Who? And then if they have it, do they have to go back over everything? You know, 'oh, you invaded Crimea.' 'Oh, you expanded NATO.' And you've got the Germans in our border in the Baltics. And back and forth it go, you bombed Iraq, that was one of our allies. And then ask us about it. And then we say, well, 'you're shooting your former spies' or whatever it is.

And it's so tangled. So, you have the nuclear technical questions about the weapons, about safe paths forward, about arms control, about verification control systems, and then you have all of this historical entanglement But that goes nowhere.

So, I think the big problem, I'm not asking to forgive. But I think to be clear about where we are, how we got here, and there is the path forward. But it's not a path that's being chosen and it's not a path that's being discussed. So, I would say, almost clear thinking about this problem is totally off, like the front page, but the back page. So, to the extent we can get this stimulated, more inquiry and more open inquiry as to how we and the Russians -- how we could find some path, not to solve everything, but just to get away, get steps to make things safer.

And I would just say in terms of the political media, which I've carefully followed for the last 50 years, issues like this are not news. There's something called news of the day. That could be a tweet, it could be a scandal, it could be the stock market going down. But of all the things that can be called news of the day, this is not one of them. The way I like to put it succinctly, the end of the world is not news. It is not news. So, you're not going to hear about it. And after it happens, you won't be reading it anyway.

So, that is really the challenge, how to get on top of an issue. And the truth of the matter is you can't do anything about it. It's really our elected officials. They got to move. So, we can move them; universities and scientists. There are people that can have influence and they've got to keep pushing. But right now there's not a lot of push, there's not a lot of push. The drive within the nuclear industry, the arms industry is a lot more powerful than the drive to control and there we are. So, kitchen table issues or personal attacks or tweets, all that is hot news. But what we're talking about tonight is very, very marginal to anybody's consciousness, unfortunately.

MS. HINDERSTEIN: Well, I think the first half of those remarks will come into play in two questions in a very relevant way. But let's get to the second half of those. What should be news? So, the next question we wanted to ask is what is most needed to advance arms control in the next decade? What should be the news? How should we be making news? Do we need more or new treaties? Do we need to build on the U.S. Russian bilateral treaties? Do they need to be multi-lateralized, et cetera? Do we need new technical tools? Is this a question where we don't have the tools in the toolbox to do what we need to do?

Do we need innovative solutions? Do we need to think about things in a 21st-century way that -- we're used to thinking in a 20th-century way? Do we need to do things unilaterally? The United States just says, "We need to decide what's best for us and we don't need to match our steps with what anybody else is doing." Or do you have another idea? And if you're asking -- if you have predicted anything already in the session, it's that if you said other, I'm going to come and ask what you mean by other.

So, we have a lot of votes here for new treaties. We have a lot of support for those structural elements of arms control and nuclear threat reduction. We have not as many votes for technical tools. A lot of votes for innovative solutions and unilateral reductions. I've got about 69 votes. People can keep voting here. But I want to turn to Dr. Goldblum, because you work a lot on looking at what that technical toolkit is. Are there things that we should be putting more resource in, putting more intellectual capital in? Are there technical things that would help the arms control environment?

DR. GOLDBLUM: Well, I would say I'm not surprised that there's not a high number of votes here because we have the technical tools, for example to verify the extension of New START. But I think it's important that we continue to invest in this space, especially as we drive to lower and lower numbers of nuclear weapons. Because there verification becomes increasingly challenging as you have to balance preserving sensitive information with confidence and the verification assessment. And this is the kind of work that we do through the Nuclear Science and Security Consortium. So, our students have the opportunity to do collaborative research with the national laboratories to develop technical tools for verification, monitoring, and source search and localization, and other mission needs.

MS. HINDERSTEIN: Well, I think it's really interesting because you're building the next generation through these programs and you're building a cadre of people who are ready to turn their skills towards things like verifying, monitoring, et cetera. But then when you balance that with that blue piece of the circle there and we have to think about what are they going to apply these tools to?

Before we come to more and new treaties, Secretary Moniz, innovative solutions. I'll ask people out here what they thought. But I would consider the Joint Comprehensive Plan of Action with Iran to have been an innovative solution. It wasn't a traditional treaty mechanism. You had to come up with a lot of creativity. And while I eminently thank Andrew for his compliment of putting me in charge of having developed the JCPOA concepts, I only was a lowly implementer but Secretary Moniz actually developed a lot of the concepts. How did you find the process of innovating in the context of an actual urgent nuclear and national security crisis moment? How do you balance those things?

DR. MONIZ: I'm going to take the liberty of the first question.

MS. HINDERSTEIN: Perfect.

DR. MONIZ: And then come back to your question. Just to say that the question is phrased what's most needed. And in that context, I have no problem with seeing more new treaties to be having the, you know, the dominant response. However, I have to say, at least arguably, we may very well be past the age of treaties, any treaty, not just in this area. — So, that leads me to say: innovative solutions are probably the way to go, even though they do have their own risks as in the Iran agreement.

But to answer your question directly, in the Iran agreement, it was interesting that it -- frankly, I think the break that could lead to an agreement involved having, in this case at least, technical competence at the table for the negotiation and not just backing up the negotiation. Because to achieve the goals, which were restrictions on Iran's nuclear activities that they could accept and yet we could see as a guarantee of -- a guarantee that if they were to restore their weapons ambitions, we would have plenty of time for response.

Connected with an even more important part, which I think is the most innovative part, and that is a verification regime that is completely unique in the annals of nuclear verification with new tools, some of them technical tools of the type that you are hopefully advancing even more, but a set of restrictions, of verification opportunities for the international community that would really provide confidence to the international community that a weapons program was not being pursued. And just if I may go beyond the answer to your question, just for informational purposes in terms of where we are today with the Iran agreement, where obviously the United States withdrew from that, but it has been very interesting that while Iran has now said that they are no longer subject to the restrictions on nuclear activities.

Number one, they have been very measured in going back to their nuclear activities. But even more important, they continue to observe all the verification regimes. So, in other words, they're saying, 'Look, you know, you're not playing, we're not going to play in terms of restrictions. But we understand.' I'm phrasing it as I think they would or I hope they would at least that -- 'but we understand that in the end, the international community needs to have confidence that we are not pursuing a weapons program. And that is built upon the verification regime. And we will continue to cooperate with the international inspectors.' It's a very, very important point.

And so I think that falls back on the fact that this was put together in an innovative way. But I might say, as a pure process, it was an innovation that you had on both sides if you like, two cabinet members in parallel negotiating an agreement, recognizing that this was a case where you needed traditional diplomacy, but you also needed science diplomacy to bring all of these threads together. So, at some point the story will be written about the innovation here.

And hopefully, eventually about the success of the agreement, even though it looks a little bit dark right now.

MS. HINDERSTEIN: So, I think you did that, you connected actually a lot of the different pieces of this circle which was that we need technical tools to put in the context of agreements. But we need innovation because every case is going to be different. Each country needs to make their own decision as to what their national interest is. There's a lot to learn from that process. Whether or not you agree with that, the final outcome was exactly the outcome you would have hoped? I think there's a lot to learn and thank you for the update on the current situation.

Governor Brown, you wanted to add something here. And then I'm going to turn to all of you. So, be ready. You're not off the hook.

MR. BROWN: I think what Ernie said is very interesting about science diplomacy. I'll add to that political prudence in that measuring what's doable. And the diplomacy that went to restricting the conversion of the Iranian nuclear program to weaponry, that was isolated from their other activities in sending missiles around or different kinds of soldiers and troublemakers around the Middle East. They didn't try to solve all the problems and one of the reasons that Trump and the critics pulled out was because Obama and Ernie didn't solve all the problems. But he solved a very important one. I think that's very illustrative of what we face in the nuclear field. If we're going to try to solve all the problems, we're not going to get out of it. But if we take an important piece, and there's nothing more important than reducing the possibility of a nuclear exchange or blunder, then we get somewhere. But that, what I just said is a very contested idea. And a number of people in Congress didn't like this agreement either because they didn't like Obama or they wanted to get Iran more restricted. But all of that illustrates the point is reducing nuclear danger is so valuable that we ought to do it even if there are a number of other problems that we'll have to defer to another day. I think that is an important point.

MS. HINDERSTEIN: And the argument that if we take the nuclear problem off the table, it might put us in a better position to deal with some of those other issues.

MR. BROWN: That was the argument and we'll never -- we'll find out until we get someone who will resurrect it.

DR. MONIZ: I think we're probably not going to get there. But I just want to add the comment that with North Korea and the path to denuclearization. We're going to need to do my

word again, work, the hard work of putting together structured negotiations step by step to get there. And unfortunately the promise of opening up those discussions has not been consummated because, frankly, we haven't done the work to put together that kind of negotiation. Sorry, an aside.

MS. HINDERSTEIN: Thank you. No, it's a good point. Thank you for adding it. I warned you, but did anyone who said other want to say what they would have answered here? Oh, perfect. Thank you.

MS. CABASSO HAS: Hi. I'm Jackie Cabasso. I'm the Executive Director of Western States Legal Foundation in Oakland. And we are a member of the International Association of Lawyers Against Nuclear Arms. So, I want to say something about the JCPOA before I say what my other is. Although they're related, I'll say my other: good faith. Closely related to good faith is political will. Good faith is a legal concept. With the JCPOA, we say that the United States didn't withdraw, the United States violated the JCPOA because it was violating a UN Security Council resolution that was adopted simultaneously.

I could talk about this a lot, but let's just take the nuclear non-proliferation treaty, which is approaching its 50th anniversary and review conference this spring. The United States committed to negotiate in good faith the elimination of its nuclear weapons and the end of the arms race at an early date. Most of the non-nuclear weapon states would say the United States is in violation of those good faith agreements. And we've done a lot of research on the legal meaning of good faith, but if we think of it as contract law, the United States has violated the contract, not only the United States, but I'm an American, we're talking about the U.S. So, I think that good faith and political will are essential for any movement on any of these trends.

MS. HINDERSTEIN: Thank you for that comment.

DR. MONIZ: And just to add to that.

MS. HINDERSTEIN: Yeah.

DR. MONIZ: The review conference is coming up; it's a very important one. It's not looking very good, can we say, at the moment. And there are many steps that, frankly, one step could be taken anytime, re-extend New START, which would help at least in kind of going back to the pact that was made in the NPT. But right now, it does not look like we are heading to a particularly good conclusion of that review conference. And that is the foundation of the entire non-proliferation regime.

MS. HINDERSTEIN: Please, Governor Brown, and then we'll take a comment here.

MR. BROWN: That's Article 6 that she's referring to and it's written in a weasely way that it talks about negotiating in good faith on, it doesn't say negotiate to eliminate. One could, taking Ernie's point about the work, you could say, we want to embark upon a process to eliminate nuclear weapons. And you could outline the steps. Maybe there are 100 steps, maybe there are 200 steps. You may not be able to do all 100, but you can do 5 or 6, and you can get the ball rolling. There was a time, I think it's 6 or 7 years where George Shultz, Henry Kissinger, Sam Nunn, and Bill Perry wrote [an article](#), a couple of articles in the *Wall Street Journal* saying, let's get rid of nuclear weapons. And they laid out a very schematic -- a very general path on how to get there.

Now, no one could even think, you could write such an article. And that's why we've lost ground here. And we got to recapture that ground. Not that we're going to solve it all in one day. But we at least have to get a work schedule for the problem. People aren't even thinking that. So, there's a lot we could do without having to be utopian and say, we can get it all done. I think it'd be very nice if we started moving down that path.

MS. HINDERSTEIN: It comes back to the directionality question that was raised. Let's just add, I had promised this woman right here for a comment. But -- yeah.

SPEAKER: Yeah, I think this sort of adds to what Governor Brown just said. I voted other even though I could have voted more or new treaties. I do believe in the treaties. But I think the problem is that our treaties have been with the Soviet Union or with Russia today. And, you know, the world has changed. There are many, many nations that have very advanced nuclear weapons, probably more than we know, more both in the sense of the number of nations and more in the sense of the sophistication and number of weapons that these other nations have. And I think this is something that we just don't take into account and keep thinking.

I mean, I'm 72 years old. So, I mean, I certainly think in terms of Russia against United States, that was my era. But we're moving into another era where there are many, many nations that have nuclear weapons, more than we know. I mean, I personally feel certain that Iran has nuclear weapons. I think they have that. So, I think we need to be thinking in a broader term here and I think Governor Brown was actually alluding to that. I think that sort of adds on to what he said.

MS. HINDERSTEIN: Thank you. And we're going to come back to a lot of the specific questions including some of the ones that came up in the word cloud. But let's go to the next question. Since there are about 13,000, -- nuclear weapons in the world, the U.S. and Russia do have about 90 percent of them. The nature of arms control does require working with other countries. So, would you sit down with Putin? You're President of the United States now. Would you say, "No, I wouldn't sit down with Putin? There's election interference. It depends." Or I don't know, maybe some of you think, yes.

For those of you on the live stream, we're seeing the yes bar bounce up very quickly. Oh, good. We have some intrepid no and depends voters, I value you. We need some diversity in the audience. I'm going to put Bethany on the spot. Dr. Goldblum, this is -- I'm asking you this specifically because I know this is not your space. In the sense as a professional, you don't work on diplomacy or the politics of it, but you're an extremely knowledgeable and well informed person and you watch this issue overall. Dr. Goldblum is suddenly President Goldblum, would you sit down with Putin?

DR. GOLDBLUM: Of course, I would welcome the opportunity to sit down with any of the world's leaders, but I am just a nuclear scientist. What I can say is here at Berkeley, we work very hard to introduce the policy angle, in particular the intersection of policy and technology. And I think it's important that we provide opportunities for cooperation across national boundaries and opportunities for young people to engage on technical and policy issues. So, for example, my colleague, Sieg Hecker leads the Young Professionals Nuclear Forum, where they take students from U.S. universities, including some who are in the audience, to Russia to work with students from the Moscow Engineering and Physics Institute, which is their premier nuclear institution. So, it's this kind of technical interchange that can help set the stage for cooperation in future years.

MS. HINDERSTEIN: So, it's not just presidents sitting with presidents, but...

MR. MONIZ: Did you say Sieg Hecker was a young physicist?

DR. GOLDBLUM: No.

MS. HINDERSTEIN: Young at heart, sir. But for sure it's in -- in the end it's not just presidents who solve the problems. It's multi-generational, it's multi-disciplinary, and I think that's a really good example. Governor Brown is suddenly President Brown. You said before, in our discussions earlier that we -- that you raised some rhetorical questions about dealing with

Russia. But now I'm going to make you answer your own rhetorical question. Would you sit down with Putin?

MR. BROWN: Yeah. Of course, I would. And I think we're going to sit down with him a lot. But the first topic would be to set in motion at lower levels of technical competence, further discussions on what is keeping Russia and the U.S. at such loggerheads. And there's a notion that I have to say, I think, was embraced to some degree by President Obama as well as others, that dialogue is a reward for good behavior. But I think it's more accurate to say dialogue is needed, particularly when there's bad behavior. And that's what I think. We don't want to go to war when Russia does something bad, that isn't quite an existential threat. So, what do we do? We have -- we won't talk to you or we have sanctions. And both of these haven't proven all that effective.

So, I would think *talk*. Talk might be completely fruitless because at some point Putin wants something and we want something. So, I would say the talk and get in motion and tell him, okay, have your other -- your underlings, your scientists, your military, your intelligence, all those people were talking not too many years ago. From what I'm being told, there's very little talk. So, just to go over there like Trump does to North Korea, that's a show. You've got to lay, you've got to prepare. And also if you do have a talk, like they did at Helsinki and the press asked the President, "Well, what did he talk about?" The first thing you know is, don't talk about elections. Don't talk about stuff other than the great threat of nuclear mistake, and we're talking about that. If they would just stick to that. But maybe they're too in the minds of the President. That's not such a big deal. He still wants to talk about the election, the interference.

Well, that's an issue, but it's nothing compared to the mushroom cloud and to the big mistake, the blunder. And even at the highest level, they don't seem to be too worried. It seems like even Mr. Putin is not too worried. He has got all of these new weapon systems and he's bragging about them and does little videos. It doesn't seem that enough people in the right places are concerned. So, yeah, let's talk, but just talk is only the -- you've got to be a lot more sophisticated than that. And you've got to go a lot deeper if it's going to mean anything at all.

MS. HINDERSTEIN: So, we seem to have, well, not a unanimous answer here towards you would sit down with Putin --65 out of our 76 votes. I have to say, I think that that surprises me a little bit as a group, but it seems to be reinforced with the idea that, we have a lot to talk about and you don't solve your tough problems with your allies, you solve them with your, I hate to use the word enemy, adversary maybe in this case. But let's think about January 21 of 2021. We're either going to have a new president or we're going to have the beginning of a second term for a president that will have now four years of runway.

What nuclear issue should be the focus on January 21, 2021? And we have a lot of choices here. And we've heard some of them already discussed and I'll read them out because for those of you not looking at your phones, it's pretty small. Renew New START, we've heard that one mentioned, the New START treaty will expire if it's not renewed. Take weapons off hair-trigger alert. Rebalance nuclear budgets from non-proliferation nuclear security and then the new bill weapons budget. Prevent nuclear terrorism, deal with Iran, deal with North Korea. We know that you would love to pick lots of choices here. I would check every single one of those boxes. But this is a prioritization question. We can't do everything at once. And there are also lots of hotspots around the world. We mentioned two of them. If there's another hotspot, South Asia, China, something else you would want to focus on, choose "Other" and I'll try to make you tell me what you said.

All right. We see votes coming in, a lot of votes for renewing New START. A lot of votes for taking weapons off hair-trigger alert, which is not something we've talked about very much this evening. Addressing nuclear terrorism coming in. Interestingly, the regional questions of North Korea and Iran are tending to be under the other ones right now, when we put it as a prioritization.

Governor Brown, you've talked a lot about this issue of weapons on hair-trigger alert and launch on warning and some of those issues. Would you like to say something about that, that threat?

MR. BROWN: Well, the first thing because you only got a few days is renew New Start. So, you can do that. How many days?

MS. HINDERSTEIN: Less than a year.

MR. BROWN: That's the number one thing that a President can do with a stroke of a pen. So, right after he's sworn in, that should be the step if it's not done. Hopefully it's done before then.

And this business about, you know, alert, that's a whole launch on warning. I think that's a great process and we got to think about. I don't know the technical aspects.

I know Bill Perry likes that. We need to get more time. And what's happening in this is faster weapons. What is it, to hydro -- what?

MS. HINDERSTEIN: Hypersonic.

MR. MONIZ: Hypersonic.

MR. BROWN: Hypersonic gives you, supposedly it's really five times faster or is that hype?

DR. MONIZ: It's kind of hype.

MR. BROWN: Hype. But it's a few times.

MR. BROWN: It's fast, is not slower.

DR. MONIZ: The point is, we already have hypersonic weapons. They're called ballistic missiles.

MR. BROWN: Yeah.

DR. MONIZ: And so the issue here is they are hypersonic weapons, five times speed of sound, up to maybe 20. But missiles already do that. The question is, these are maneuverable and low. So, they are much more evasive to any kind of ballistic missile defense.

MR. BROWN: Yeah. So, that's probably the last thing we need right now.

MR. MONIZ: Yeah.

MR. BROWN: We need some agreements. But you can't get agreements unless you have some kind of dialogue and you can't have dialogue if it's going to be a reward because we all know the behavior is bad. So, we've got to shift that paradigm to talk, to deal with the problem and find an opening.

MS. HINDERSTEIN: Dr. Goldblum, I'm interested in which one you would pick, but I'd also like your comment because, we haven't talked about the risk of nuclear terrorism very much tonight. Obviously the nuclear security work that you and your teams do is really focused on reducing those risks of the access of non-state actors to nuclear facilities or material and detecting if there is material out of regulatory control or, you know, loose material. Do you want to say something about those risks and how you think they fit in? Maybe that wouldn't have been your answer though.

DR. GOLDBLUM: Well, I think that the most urgent issue here is the extension of New START because it's the only remaining arms control agreement in place that puts any kind of limit on U.S. and Russia nuclear arsenals. But we also see up here a number of important issues. The big three proliferation concern, some terrorism, as you mentioned, we've got Iran, North Korea, South Asia.

In the case of the Iran deal being terminated, we're either going to need to re-engage on that deal or come up with a new deal, if we want to make progress. With North Korea, they have an increasingly sophisticated nuclear weapons program and there's no current method or timetable for denuclearization.

And with India and Pakistan, tensions remain high and there's no real forum for dialogue. So, the problem is that the issue that gets the most publicity tends to get the most attention. But all of these issues are incredibly important and all warrant presidential attention.

MS. HINDERSTEIN: Secretary Moniz, you've actually worked on pretty much all of these. What do you think is from a prioritization standpoint, again I'm not saying that means we don't work on other things. And let's take New START off the table only because I take Governor Brown's point that that's something a President can do with a stroke of a pen, right? So, where do you think the focus is?

DR. MONIZ: Yeah. So, first of all, I'm not going to take New START off the table. And I certainly agree with what both of my colleagues have said that that's a kind of a no brainer to sign and extend it. However, I put New START then in the same context as many of the others. These are not one-day issues. Even on New START, I'll remind you, if you extend it for five years, there's no other extension. Day one, you sign it. Day two, you start to think about, how do I use the 5 years?

MS. HINDERSTEIN: So, you're saying there is more work?

DR. MONIZ: Yeah, it's work. It's always work. And actually it may be worth pointing out, actually at NTI, one of our distinguished fellows of last year was Jill Hruby, the former Sandia Director, and she did a paper that looked at all of the new Russian delivery systems. One conclusion from [that paper](#) was that the hypersonic weapon would come under the umbrella already of New START, if it was extended. And the Russians have subsequently agreed to that, that they agree it would be covered. That's a good thing. That's already a reason. Sign the damn thing.

But the other weapons systems, like for example nuclear powered torpedoes, would not come under New START. That's called work at it for the next five years. That's what you get. You get a negotiating period and you start extending it to so-called tactical weapons, to nuclear torpedoes, and the like. But that characteristic is true for many of these.

So, take weapons off hair-trigger. I have no idea what that means. I know what it means to start the process of designing how you would do that. I understand what it means to start the process of re-engaging with Iran, re-engaging North Korea, etc.. So, in other words, what's really needed is at the start of this next administration, whoever the President is, is a commitment to address that these are an important part of the foreign policy and security agenda. And all of them need work. They all need structured teams of negotiating, what Jerry was referring to. And that's the real question.

I'm not trying to be a homer here and advertise the great days of the past. But it is true that President Obama did something very unique in, I think, it was March of 2009. He gave a major policy speech in Prague that integrated all of these nuclear issues and said, "This is going to be a priority in my administration". And that had impact. That led to four nuclear security summits with the order of 50 leaders of state present. It led them to make commitments.

It hopefully did not complete, but it significantly advanced the process, where in the last couple of decades we have gone from almost 50 countries with high enriched uranium stocks, which is weapons material, to just over 20. So, you know, you can look at it half empty, half full, it's only still over 20, but the fact is we had almost 50.

And so it's that kind of a commitment that needs to be made, appropriate staffing of the administration to carry that out. And then it's all of those issues, including New START, because of the discussions that have to happen.

MS. HINDERSTEIN: And he set that vision and so you're saying that the vision has to be set early on for all of it.

DR. MONIZ: The vision was set right early on, essentially on practically day one of a new administration that had at least aspired at that point and proved to have an eight-year runway to actually make real progress on these issues. An American leadership on these issues is absolutely essential and made a huge difference.

I apologize to go back to an earlier comment and I say respectfully, Iran does not have a nuclear weapon today. And the reason is that they had a very organized program through 2003.

But the irony is there was one missing piece, the essential piece. They don't have the nuclear weapons material and that's what the whole deal is about, et cetera. I would say that I have to make that point and I feel quite confident in that statement.

MR. BROWN: And I want to make a comment which illustrates the problem we have. I think what Ernie said is very much to the point that the Obama speech set in motion a number of good things. But as I use the word tangle, things get tangled. So, Ukraine starts getting a little color, a little activity between, are they going to tilt more to the Western, stay more in the Russian orbit? And then we have one of our high foreign policy officials who are out there in the protest arena there handing out cookies and things. That was Victoria Nuland. And then pretty soon, Putin decides he's going to go grab Crimea.

And so this thing goes back and forth. Somehow we have to get a priority of the nuclear that when other stuff is happening, we still keep talking. I think they did that in the Soviet American days, a lot of bad things. We had a Vietnam War, we had a lot of things going on. But we could chew gum and jump open to a bunch of other things all at once. So, I think that's a missing ingredient that we overreact over generalized. Yes, it's a problem. That doesn't mean this big huge problem called nuclear doesn't always require engagement at all times. That is the point that has not been validated yet, that is not accepted by the powers that it would be.

I think if we could just get that point, then we could keep going instead of getting diverted every time Putin does something. And I'm sure he's going to assassinate somebody and if he figures he can throw the election or show a lot of discord, why not? It doesn't cost them that much. So, I think we have to keep our eye on the ball as well as get our defenses technically for all these other problems that we've run into.

DR. MONIZ: And, you know, and I think it's absolutely spot on. I totally agree. And I would just note that even since the egregious acts in Ukraine and in particular the going into Crimea and exiting Crimea, even after that in the nuclear sphere, I can give a couple of examples whereby focusing on those issues, we got stuff done.

For example, the U.S. and Russia after that did work together on some evacuation of high enriched uranium from a country where there was no need to have it there, shall we say. And another one, and I go back to this, people often forget. The Iran deal was signed in July of 2015, well after the events in Ukraine. And Russia -- I was there -- Russia was an extraordinarily constructive part of that negotiation. So, we can do what you're saying, Jerry, and we need to do it.

MR. BROWN: That's a good example.

DR. MONIZ: Yeah.

MS. HINDERSTEIN: So, I think that we've put you in the position of a president for the last couple of questions. But now I want to put you back in the position of you. You've taken a great step by coming here and listening to this discussion, which I found extremely interesting and I always learn things when I hear and talk to these three people. But there's a lot more we can do.

So, now that we've talked about what's at stake, what we have at stake, I'm not sure if you're aware that it is an election season. And I want to know what you are prepared to do to bring some of these nuclear issues to the forefront of the political conversation. So, the next question, we'll ask you what actions will you take to address nuclear threats in the 2020 presidential race.

And you can choose as many as you want on this one. We're not going to limit you. No prioritization required here. Let's follow the bouncing balls. Let's see. I mean, you can share information on social media and by that I would hope we would share good and validated information on social media. Attend rallies or protests.

MR. BROWN: That must be the students...

MS. HINDERSTEIN: Volunteer. Educate yourself, make sure that you're not only learning, but then you're sharing what you've learned with others. Write letters, make calls, do respond to text, register to vote. And our favorite category of other. I think everybody gets to say, educate yourself because you came tonight. So, that's like a given right there. I want to ask our panel and starting with Governor Brown as a multi-time elected official and very active in the political process obviously, what kinds of actions can people take? You know, everyday citizens who care and are learning, what matters? How can they participate in the process?

MR. BROWN: I believe they have, every time you get an opportunity, and a lot of people here in this room won't get an opportunity. But over the course of this primary season, there've been thousands of opportunities to address presidential candidates. They come into California. They came into Iowa and New Hampshire, they go to all of these places. And they're here.

And how many times does somebody raise these issues? So, I would say raising this issue, whether you're a funder or a participant at one of these gatherings, there does come to be a

chance to get people aware, to get the candidates aware because they're not hearing, they've got their game, their playbook, and doesn't include anything we talked about tonight. This is totally off the chart. So, we got to put it back on the table. That's the number one thing.

And what you can do, if you go to any political rallies or if you know anybody or you write letters or something, it has got to get going. I mean, we had a nuclear freeze movement that had a lot of activity. When they put the missiles in Europe, you had millions of people protesting. Of course, after you put the missiles in Europe, then Reagan and Gorbachev started taking it more seriously. So, maybe we have to get further down the road of nuclear danger before ready to pull back.

MS. HINDERSTEIN: That sounds like escalate to deescalate, Governor Brown.

MR. BROWN: Yeah. It does.

MS. HINDERSTEIN: I'm not sure on that one.

MR. BROWN: I'm not recommending it.
But I do think that people learn by doing.

MS. HINDERSTEIN: Yeah.

MR. BROWN: And not by exhortation. That's one of the problems. So, the only thing I can say is, try to wake the candidates up. And if you notice, even the news people are trying to be remembered. So, they're trying to get whatever the brownie points are for their careers. And then one of the candidates did a little attack and all of a sudden the fundraising went up.

So, they're looking for fundraising. They're looking for tweets. They're looking for eyeballs. Everybody's looking for something. But now, nobody's, at least not very often, looking to put this issue before the American people and deal with it. So, I don't think it's that easy, but at least you kind of rub your nose into this and let's keep thinking about it. Don't stop because we have a long way to go before we can get our candidates talking about it.

MS. HINDERSTEIN: Thank you, sir. Secretary Moniz, what do you think?

DR. MONIZ: I think there should have been another one up there called educate others.

MS. HINDERSTEIN: Educate others. Okay.

DR. MONIZ: After you've made the effort, you may as well educate others.

MS. HINDERSTEIN: Become one of those trusted sources.

DR. MONIZ: Because in the end it is the network of people who have to provide what Jerry was talking about fundamentally, is political accountability. And obviously I'm not suggesting any more than Jerry was that we should be doing like one issue. We should become one issue politicians or one issue voters, but this is an important issue and it has got to be a part of the political accountability discussion.

And by the way, going back to our earlier discussion of the panoply of existential threats, the same is true in climate change. Maybe you can see a glimmer of beginning to get political accountability in that, but we've gone a long time without adequate political accountability for something that was clearly, clearly needed to be addressed. So, anyway I just put that in the context of all of these issues, political accountability is key.

MS. HINDERSTEIN: Dr. Goldblum, you have a day-to-day connection with the university community and with students coming through. You've seen a few , classes of students coming through. Where do you think people are prepared to engage now? I mean, you may be a little self-selecting because people coming to your work and your research are already indicating an interest in this. But where do you think people are prepared to do the work right now?

DR. GOLDBLUM: You know, Corey, I think it's important that we ask these questions to the students. I mean, what we find with the Nuclear Policy Working Group, for example, is the students are coming and asking for help in interpreting the stories on nuclear issues that they read in the news. And so part of what we do is help to provide the foundational knowledge for them to understand the policy implications of what they read. So, I'd be really interested to hear what one of the students has to say on this.

MS. HINDERSTEIN: Well, I did not set you up, but it's a very great answer.

KATHY: Thanks, Bethany. I'm going to take that as a shout out. So my name is Kathy. I'm a PhD student in the Nuclear Engineering Department. I'm also part of the leadership at the National Science Policy Network, of which the Nuclear Policy Working Group at Berkeley is a member. It's a chapter of our group. And we are aiming to do exactly what you guys are doing with nuclear issues across the country. And I think one thing that I would love to hear your guys' feedback on or information about is what and how students can actually get involved.

Not just you guys at NPWG are doing awesome work in terms of on the academic side, a lot of research and publishing papers, which is phenomenal. How do students get involved in this process? How do students get involved in the next iteration of our future treaties or things along those lines? What can we be doing? There are a bunch of members of the science policy group at Berkeley here. I see you guys all over the place, which is awesome. What can we actually tangibly be doing on this issue?

MS. HINDERSTEIN: I will say, specifically the applications for the NTI Summer Internships are open.

DR. MONIZ: I was just going to say, ask Corey for a job. That's the same thing basically.

MS. HINDERSTEIN: Anything else that any of the three if you would want to add to that? I think that's an extremely relevant question. Like you get educated. You get empowered. You get active and excited and then where do you go with it? Yes. Please, Governor Brown.

MR. BROWN: Well, I used to be on the Berkeley campus. I saw the teachings and it might be -- that's something that starts out slowly. But that started out slowly in the '60s in the Vietnam War. But then they had teachings, prominent people, larger crowds, and that then becomes attention getting and people start to pay attention and then it becomes news.

MS. HINDERSTEIN: Yeah.

MR. BROWN: So, I think -- I don't think it's too soon to be thinking of actually taking what you're learning and then having teachings, and that putting the signs up around the campus and then doing it on more campuses and building it up. And it's possible you light the spark and it will spread. But it does take some charismatic leaders. That young girl Greta made a lot of impact. Well, we need someone on the nuclear issue to be doing that. And no one I can think better than students who are actually working on nuclear engineering. That's a great place to start.

MS. HINDERSTEIN: Comes back to one of your first comments. Make it news, right? Make it news.

MR. MONIZ: Yeah. I might just add to it. You mentioned Greta Thunberg and she fits directly into this theme of political accountability. Greta Thunberg for example, she has made it very clear that it's time to do something. But she herself is not actually saying that "and here are

the solutions". She's saying, "You, Governor Brown, it's about time that you put forward the solutions".

But then there's other, like for example, I missed your – I've forgotten your name, who made that comment. But you're a PhD student in the field. So, you may be looking at a very, very different trajectory in terms of actually developing and promoting the solutions themselves. And for that, I would just say that, boy, we've got a lot of space for you that -- I'll be honest, this is an area where having young people prepared to really roll up their sleeves -- and did I mention the word work before -- is really important.

It has also been very encouraging that in these last years and you can see it at NTI in practice. We are getting much more diversity in those who are seeking these solutions and that has been very, very important. And I think that will work as well for the future. But again, we are certainly at NTI, but I think more broadly in the whole area of security studies, foreign affairs, nuclear specifically, we are very, very eager to get the participation of students like you.

MS. HINDERSTEIN: I welcome that. And we are at the end of our time. Since a lot of people said, that you want to educate yourselves, we have a few other sources, places that we think are trusted. We do have a petition at nti.org/saferworld2020. Please sign the petition. There are a lot of podcasts. I don't know about you. I'm a podcast person. But there are a lot of podcasts. [At the Brink](#) is one that's going to be coming out soon with that William Perry, Secretary Perry, is leading. There is also [Press The Button](#), [Big Nuke Energy](#), [Things That Go Boom](#), there are a bunch of those.

You can go to YouTube and watch this new show called [Getting Bombed](#). It's basically like a mix of Drunk History and this seminar we just did. So, they talk about a lot of issues. You can be part of crowdsourcing, if you're interested in geospatial information. I mean, we're a Google Earth generation now. So, you can go to geo4nonpro.org and be part of a crowdsource.

There's a [SIGNAL](#) video game that has been developed here at Berkeley with Bethany and her group. Andrew is a leader in that as well. You can go to signalvideogame.com and play that. There's an excellent book also by Dr. Perry, "My Journey at the Nuclear Brink" that talks about the perils that we're facing. And so there are a lot of things you can do.

And another thing you could do is watch the video [Atomic Soldiers](#). And *The Atomic Soldiers* is a documentary that you can stream online, which has the voices of the people who were actually involved and affected by the U.S. nuclear testing program, the military officials

that were involved in that. And on that note, I see we have the desire to make another comment from somebody else who was affected and we'll let you do that, sir.

MR. TANEMORI: Thank you. Do we say that all due respect, the panels, all the intelligence, knowledge, everything else, life experience, all that discussion tonight. And subject after subject discussions and you have expanded so much. But my question to you, what is your ultimate goal of all of this? And I say to myself, now looking at what is that for me. Perhaps we are looking for, I'm paraphrasing the sentiment, we are using the term peace. We are looking for peace. We have the perception or conception that peace is absence of war. That may not be the truth.

I saw the picture that Chinese artists drew the picture, two birds are sitting in the perch on the branch and they are by the waterfall and the branch is pushing back and forth, back and forth. But the two birds are sitting on the branch, they're chirping each other with smiles. That might be the element of peace. So, my question again addressing to you or the one thought, knowledge, discussion tonight, what is the ultimate goal that we are looking for?

And I'd said, as the survivor of Hiroshima, the heart, the issue, spiritual issue. I once again quote, reference Douglas MacArthur, he's my hero because he was the one who made what Japan it is today, whether we agree or disagree. All right? He is loved or hated. And I could say that Truman, I'm sorry, you're the big second hand. But today, again, I say that Japan as a nation of people, what Douglas MacArthur did and he emphasized human conflict. What we are trying to achieve, the relationship, harmony, the unity, so called peace cannot come by debate or this, except the deed in the human heart. And I say forgiveness is granted for the -- toward global peace. Thank you.

MS. HINDERSTEIN: Thank you.

(Applause)

MS. HINDERSTEIN: I think that's a good note to end on. Please join me in thanking Governor Brown, Dr. Goldblum and Secretary Moniz for joining us tonight. Thank you.

(Applause)

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