EMPOWERING WOMEN AND GIRLS THROUGH STEM EDUCATION

Panel Moderator: *Catherine Bertini*
October 14, 2015 – 1:35 p.m.

Introduction:

Ambassador Kenneth M. Quinn
President - World Food Prize Foundation

Now we're going to continue with our panel, and the chair is our 2003 World Food Prize Laureate, Catherine Bertini. And you know when Catherine received the World Food Prize and was selected, it was for leading what we considered to have been turning the World Food Programme into the single most effective organization for delivering food to hungry people in all human history. And she came here, though and talked about that very issue that I had never focused on, about how the importance of delivering food through women, and the difference. And the stories, Catherine, of you standing up to the Taliban there so that they couldn't turn women out who were working and the lessons you learned and shared, at least for the World Food Prize and here, I think, for many people really put that issue front and center on the agenda. So thank you for what you've done about that, and thank you for your willingness to chair this panel.

Panel Moderator:

Catherine Bertini
2003 World Food Prize Laureate

Panel Members:

Chelsea Clinton	Vice Chair, Clinton Foundation
Michiel Bakker	Director of Global Food Services, Google
Robert T. Fraley	2013 World Food Prize Laureate
Kim Reynolds	Lt. Governor, State of Iowa
Mary Wagner	Global Senior Vice President R&D/Quality, Food Safety & Regulatory, Starbucks

Catherine Bertini

Thank you very much, Ken. I wonder if our fellow panelists will please come and join us here. And as you come up, I will tell everyone a bit about the ground rules before I introduce the panelists. Since this is a discussion about women and girls in science, technology and engineering and medicine, we are going to be hopefully technological and modern about how we have this discussion. So initially we have 30 minutes of give and take on the panel and hopefully impactful, pithy comments; and then we will have 15 minutes of Q&A. We are not going to use the microphones in the middle of the room. We are taking questions on Twitter, so

the Twitter handle is #FoodPrize15, which I hope will be up on the screen to see, and we ask you, please, to tweet your questions, and we'll do our best to answer as many as we can. If you're not Twitter savvy, find somebody in your row who is and ask them to send in a question.

So, thank you, thank you, Chelsea, for joining this panel and for your remarks. I'd like to ask you to join me in welcoming the following people who are here. Lt. Governor Kim Reynolds, whom you've already met, who has been lieutenant governor of Iowa and a close partner of the governor here for the last five years. Rob Fraley, who's the 2013 World Food Prize Laureate and Executive Vice President, Chief Technology Officer for Monsanto; Mary Wagner, who is Global Senior VP for Research, Development, Quality, Food Safety & Regulatory at Starbucks; and Michiel Bakker, who is the Director of Global Food Services at Google.

So we'll begin in a moment, because I think we all need to give appropriate credit to our World Food Prize Laureate, Sir Abed, who has done so much with BRAC in order to reach girls and women, not only with education but with technology throughout Bangladesh; and his work, which we'll hear much more about later, is work that's made a huge difference to the lives of women, girls and men and boys in Bangladesh. So, thank you. We're honored to be here with you.

Also one other thing important to say is, when we talk about STEM, it's important to say that agriculture and nutrition is part of this work of STEM, and it is part of each different piece that we are talking about today.

Mary—Starbucks has made significant commitments to these issues and to integrating girls and women into your programming. Tell us why it's important, not only for the company but for the world.

Mary Wagner

Well, we've talked about it a lot, but I think there's probably three core reasons that it's so important to get girls into STEM. First one—and, Chelsea, you talked about it—is the issues facing us. As we look forward, we have to get really smart people focused and working on those problems. I think the second thing is we have to, for girls we have to expose them and give them an opportunity to break down these barriers so they'll try it. And then lastly, I think that we just have to believe that we're going to be able to do this. So let me just talk a little bit about the first one.

So what are we facing? As a food scientist, I see 9 billion people in 2050, and so that means food has to go farther, we have to figure out water, we have to figure out food security, food safety; so it's endless in terms of things we have to look forward to. So we need to get smart people working on that.

I think the second thing is, as an employer, I have a pipeline to fill. So I look out and I say, wow, how am I going to fill this? Fifty percent of our workforce is women or girls but only 24% are the STEM careers. I mean, that's just egregious. So I believe that we need to redirect our efforts. Starbucks does a lot for education, so education is part of it, but exposing them and then following them through, too.

And then I think the other thing is—I'm a mother; I have two girls. They're smart. They love science and math. So I want to eliminate the barriers that might conflict with their choices. I have to do that. So I think to that point, it's pretty exciting; because you look at the stage here in terms of what we're doing to break down barriers for girls—and you're going to hear a lot about it probably from Rob or Michiel—but we've collectively worked together to create an opportunity to bring girls into our facilities in March, this coming March. We're going to bring in hundreds of girls from Seattle to Starbucks to Monsanto in St. Louis and San Francisco, Google, and other companies not up here on the stage. We're going to expose them to careers. We're going to immerse them in a project, just for a day, but we're going to mentor them through that so that we follow them through after that day and create other opportunities. So we're collectively working together because we have a need.

And then lastly I just want to say that it's so important for me personally, because I am an employer, I have daughters. And I think that if we focus our efforts, I know we will be successful. As a former president of IFT—and I'm looking at Al Clausi because he's here from me often—and as a member of the board of Girls, Inc., which is an organization that really focuses on making young girls strong and confident, in the past I've brought the two groups together and actually sponsored girls at our annual meeting to expose them, just expose them, get them excited. And this year we have our first undergraduate applying to Davis in food science—so progress. It's one, but you have to be committed. So that's what I think.

Catherine Bertini

Thanks very much. Rob, would you talk to us a little bit about some of those hurdles that we all know intellectually, at least, but you've probably seen firsthand in your tech role at the company.

Robert Fraley

Maybe before I jump into the hurdles, I'd just like to maybe reset why this is really so important. You know, it's been mentioned several times, you know, world population, world demand for food increases. You know, by 2050 the demand for food is going to double, and we're going to need all of the innovations to both help increase crop productivity and reduce food waste. And a lot of those innovations are going to just come from the incredible advances that we're seeing today in biology and data science. And it's really clear that we're going to need a workforce that is more skilled and more capable. And if I just focus on the U.S.—and I know these numbers really well, because I just sent my last daughter to college in August; and when she graduates hopefully in 2018 (I hope she can do it in four years or so)—about three million kids in this country will be a participant in a STEM program.

Now here's the problem: Just in the U.S. alone, if I look over the next ten years, we're going to need a couple million jobs, so three million kids coming out of college—about probably less than 175,000 of those will actually pursue a STEM career. So we're at a net deficit in terms of what we need just to fill the talent pipeline. And then as several folks mentioned, you actually look at the composition, although the breakout between boys and girls is about 50/50, today somewhere between 25 and 30% of the STEM-related field participants today—you know, the engineers, the doctors, the mathematicians—are women. And so we are underrepresented. So at

a time when we need both more and, I would probably argue, better and smarter talent, we need to do more.

As we look into this, it's obviously complicated, and many of you have studied it, but so much of this is—better curriculum and starting that scientific exposure at an early stage. And one of the things I love about the panel—in fact, working together—is it doesn't matter whether that early spark in biology or somebody writing a software program or somebody building a robot, but it's that spark. And then, as many people have commented, it's the encouragement, it's the support system. I think a lot of our problems, and what I've frankly seen with my own daughter and folks that I've worked with, is we tend to discourage women from participating in the STEM program—and we send those signals at a very early stage. So the role for mentors and for leaders to provide for the opportunity to be encouraging is so important. So that's what I think.

Chelsea Clinton

Can I expand on that a little bit?

Catherine Bertini

Sure

Chelsea Clinton

We now have research funded by the Gates Foundation and Scholastic and others that has demonstrated, sadly, but starting in middle school, teachers, both male and female teachers, start calling on girls less in math and science classes—which sends a pretty clear signal that their opinions just don't matter as much. And one of the reasons that's so corrosive is because of what also starts to happen around that age. We know from cognitive science that that is the age when kids start to imagine themselves more in other people's stories than in their own stories. So if girls and boys are inundated, as they are, with media saying—You're largely valued as a girl for how you look, not what's in your brain; you're largely valued for your relationship to other men, not for your own narrative, which is sadly what we see in G and PG-rated movies and movies that young kids are consuming when they're in these crucial middle school years—it's incredibly deflating to girls's sense of their own possibilities. And so it's not surprising, sadly, that that's when the shift starts to happen in terms of the deterioration of girls who want to grow up and be someone like any of the people on this stage today.

If you ask young girls in kindergarten, first and second and third grade when—oh, by the way, girls perform at least as well if not better on math and science tests than boys—girls will say with equal measure to boys, sometimes even at higher rates, they want to be scientists, astronauts, engineers. They also are more likely to want to have leadership positions; even if they don't know what it means to be governor yet, they have those aspirations. All of that starts to shift in fourth and fifth grade. They're no longer as interested in being astronauts and scientists. They start saying they might want to be a manager, but they don't want to be a CEO. Maybe they still want to have a career in public service, but they don't want to grow up and be the

lieutenant governor. And that is so tragic for all of us, because we're squandering that potential to solve not only the challenges we're talking about here, but any challenge at such an early age. So it is absolutely a pipeline call to action, but I think you have to start defining the pipeline even earlier than we often do in these conversations.

Catherine Bertini

Great lead-in to the lt. governor, please.

Lt. Governor Reynolds

Well, I could not echo all of these comments more. I mean, that's really been the drive behind the Governor's STEM Advisory Council. It's really… You know, those are the jobs of the future. Those are the careers that pay best. They're growing faster than any of the other jobs. It starts to eliminate the wage discrepancy that we're dealing with also. But, you know, it is about providing relevance and resource to the opportunities there. And so that was one of the driving factors behind the Governor's STEM Advisory Council and really Norman Borlaug's goal, which was to inspire the next generation.

And so our main objective was to increase interest and achievement in STEM subjects, with a strong focus on underrepresented and underserved. We had communities in the state of Iowa that had great opportunities for young people pre-K through 12 to participate in STEM programs, but it wasn't consistent across the state. So not only did we want to increase student interest and achievement in STEM subjects but we wanted to make sure through high-quality, scale-up programs that they had the hands-on opportunity to see for themselves and develop that passion that you talked about.

And one of the greatest benefits that I have seen of the initiative has really been to bring business and industry and education or academia together—because we need business and industry defining what that workforce looks like. We need to place these young people in the industry so that they can see for themselves that this is something they like and they have a passion for—all tying it to economic development. If we are going to solve the greatest crisis of this generation by feeding a growing world population, we need to make sure that our young people have the skills in STEM subjects.

And I am telling you, I've seen firsthand young girls, an all-girl First Tech Challenge team participating and excelling. I've seen young women become engaged and excited and really find a passion that they didn't even know existed for a science or a technology. And really the other thing that it does is it starts to build confidence, because it lets these young people know that it's okay not to get it right the first time, that that's part of the challenge—but stay engaged, try again, and it really helps, I think, drive that confidence and the ability that they believe that they can do or be anything that they want to be.

Robert Fraley

Yeah, one of the points you made there, I think, is so critical. It is a huge challenge, and it takes everybody working together. And I think what's really illustrative of the panel is, the ability to work with NGOs, with universities, with companies, with governments to really create more powerful, more integrated, more effective programs, because it's going to take that kind of effort.

Lt. Governor Reynolds

You need that consistency through the pipeline, I think, and that's been another… It's a public-private partnership, but not only are we doing it through the state education system but through programs like the STEM Connector Food and Ag, through Million Women Mentors. All of those are coordinating to give a wraparound to provide just the structure for people to continue in those disciplines.

Catherine Bertini

Right, and, Lt. Governor, that makes me want to give a shout-out to the group called AWARD, African Women in Agriculture Research and Development, the executive director of whom is here, because that does what you're talking about from an Iowa perspective in Africa by training women working on bachelor's degrees, master's degrees and doctorates and then having them mentor other women as part of their scholarship that they get for this purpose. It's a great program.

Lt. Governor Reynolds

Right, and we're trying to increase Million Women Mentors across the nation. Iowa, we've pledged 5,000 through 2018, and it is with the specific goal of encouraging young women to go into science, technology, engineering and math, encouraging them to continue on in college, to continue in those disciplines, and then to stay in STEM careers once they get out of college—because we're seeing them not stay in the STEM careers at a rate that we're seeing other individuals.

Chelsea Clinton

The Governor's point is… The Lt. Governor's point is so apt because it is that kind of continued mentorship. It is that connectivity and support, because it is challenging to do this work for anyone, but we know it's particularly challenging for young women. And that's partly why, through the Clinton Development Initiative, we're launching a new program to help mentor young women in Malawi, Rwanda and Tanzania where we do this work, who are in secondary schools who have expressed an interest in the agrosciences but through people doing their post-docs; because right now in Malawi in the government agrosciences fields, fewer than 20% are women. And so we know that if we want our smallholder farmers to be as successful as possible into the future, we need again the best and brightest minds continuing to think about what should be the appropriate soil composition, what should the farmers be planting. So I couldn't

agree with you more, and we're trying to kind of do our best on that dimension as well.

Mary Wagner

And plus, a lot of the industries I know Michiel is going to talk a lot about, what we're doing together. But even for companies like ours that's dependent on coffee farmers—and I was formerly at Mars, so it's cocoa farmers—you have to be a participant, just like we're talking about in the U.S.; but it really has to perforate everything you're doing. And it's a mindset and a commitment, and so that's why I'm excited to be on this stage with some of my partners.

Catherine Bertini

Right, and … All of us can't exist without this kind of background, but your company is built on it, so please tell us some of your initiatives to move this issue forward?

Michiel Bakker

Thank you. So Google aims to inspire young people around the world, not just to use technology but to create it as well. And as we're talking specifically today about women or young girls and STEM, the statistics actually provide a tremendous opportunity for all of us going forward.

So just specifically focusing on the U.S. and then maybe focusing a little bit more within the STEM on computer sciences. So if you think about the supply in the U.S. as of today, so on a yearly basis, 137,000 kids are needed with computer sciences background, so degrees. As of today we're only actually educating 43,000, so there is a gap on an annual basis, and the gap will only continue to grow. So there's a tremendous opportunity for women to go into computer sciences, but why isn't it happening?

The second reason why we're very focused as an organization on this is that women and minorities are as of today significantly underrepresented in computer science and I think in STEM as well. And if you think about it, actually then the number of high school girls who plan to use, actually follow a major in computer sciences, that is staggeringly low—less than 1% of high school students ultimately plans to do a major in computer sciences.

So the question then for Google asks—What can we do in this very specific space? And as you know, we're a very data-driven organization, so we did quite a bit of research on this in 2013 and 2014. So women who choose computer sciences, what really matters for them, and how can we actually help them?

And then the great news is for all of this in the room who are here today, and that's the factors that are driving women or young girls to go into computer sciences are very controllable factors. Ninety-five percent of the factors that actually control whether a girl will actually follow a computer science study are the following four

categories: social encouragement, self-perception, academic exposure, and career perception. The largest factor for a girl to go into computer sciences or not is the social encouragement they get at home from parents as well as in their social circle. And an interesting tidbit is that social encouragement is so much more important for girls than for boys. Boys will figure it out. But I think many of us in the room here who are parents, this is something we can do as of this evening, is giving the girls in your environment who are at high school, middle school age, we can encourage them on a daily basis.

The other one is career exposure. So I think one of the broadest challenges for girls is to figure out ultimately how computer sciences might lead to a career that fits their aspirations. One of the aspects that girls are very interested in is actually making social impacts, and the question for many girls is—how can you use a STEM career to make a social impact? And the answer to this question is really straightforward, but we're not talking often enough about the role models, like for example, Mary over here, or Chelsea, what she can do.

So we didn't stop with just providing great data and evidence. So as an organization, we're very focused on making a difference in this area as well, because it impacts our future as well. And we're basically doing three different things.

One is for making a lot of training material available to educators. We're doing that at scale, not just in the U.S. but around the world. So a lot of our training material is strictly to educate and to engage girls as well as boys in STEM, computer science is available. We help teachers, high school teachers, university teachers as well, with providing material as well as training on how to train students in computer sciences. So that's very focused on the educational growth.

The second one is to really focus on the kids themselves. We have some great initiatives; two of them I think are really noteworthy. The Made With Code Initiative is where we're really getting girls engaged with code in ways they never envisioned. Last year we worked together with the White House in actually figuring out how you can actually change the lights of the tree, the Christmas tree at the White House. We're working now with Starbucks for an event next year as well in the U.S., to show girls and boys what you can do with code. The last one is the Girls' Science Fair, which is the largest online science fair worldwide, where we ask actually kids, high school kids to showcase what you can do with science.

The third component, last but not least is actually we're trying to be a role model as well. We have a lot of women working at Google in ultimately computer science or STEM careers. We want to actually make them available and showcased to the broader world of what great careers are out there as a woman.

Catherine Bertini

Since we already have some questions coming in and they're so relevant to what you had just mentioned and some of the work that Chelsea has done, I'm going to come

back and forth; because one person, Kody Olson, has asked us, “How can we utilize data science in this effort.” And I know the Clinton Global Initiative and the Bill and Melinda Gates Foundation, as I think you referred to before, have the No Ceilings Initiative. Perhaps what you mentioned earlier, but can you talk about data in this context?

Chelsea Clinton

I would love to talk about data in this context, although admittedly I’d like to respond to a couple of other things briefly first. One, because I just saw so many people look aghast when Michiel was talking about our current computer science statistics. I thought I would just give you a couple more to hopefully horrify, but even more importantly, galvanize you.

Robert Fraley

Don't scare us too much.

Chelsea Clinton

In 2013, there were three states in which not a single high school senior girl took the computer science AP exam. Iowa is not one of them.

Lt. Governor Reynolds

No. We’re not where we need to be, but you’re right.

Chelsea Clinton

So, and another is a bit of a narrative but a short one, because it admittedly is helpful for me, so it might be helpful for all of you. In 1987, computer science graduates were 37% women. I think about that year, because that’s the year that Santa Claus gave me my first computer. It was a Commodore, and I wish I’d kept it, because one of the same model sold for about $20,000 last year at auction…

Robert Fraley

I made the same mistake.

Chelsea Clinton

It got recycled a long time ago. When I graduated from Stanford in the heart of Silicon Valley in 2001, women were just over 20% of computer science graduates; and now women are less than 1 in 5. So even though the denominator has grown, even though we now have more colleges and universities investing in computer science programs, fewer and fewer women are participating. So I think that’s an important complement to what Michiel said; because it’s not only kind of the shock of where we are now, it’s that we have lost ground.

But to answer the question about data and to build on what Michiel said, we do know what the barriers are, and we do know about where we need to intervene and what we need to help change. And this is not only true in the United States, this is true everywhere. There is a STEM gap in every country, in every country in the OECD and every country where we have sufficiently reliable data in the developing world. So No Ceilings, what you heard mentioned, is a partnership between the Clinton Foundation and the Gates Foundation in which we work to aggregate what we believe is the largest dataset ever around the state of rights and opportunities for women and girls across the world. We standardized all the data, and we made it publicly available online on GitHub if you're interested.

And we also pulled out what we thought some insights were. And some of what we found as relates to this question was pretty interesting. The barriers that Michiel talked about are fairly universal. In every country there's an imagination gap, because in no country sufficiently do we do a good enough job of showing women, like the head of YouTube, who is a woman, showing women who are leaders today, or women like Marie Curie, the first person to win a Nobel Prize in two disciplines—not just the first woman, the first person. We don't do a good enough job of elevating those stories, and we don't do a good enough job in any entertainment industry anywhere. So, sadly, this is equally true in Nollywood in Nigeria or Bollywood in India as it is in Hollywood here in the United States, sharing positive stories with like fearsome female engineers and fearsome female astronauts. The Geena Davis Institute has done a lot of work on the ways in which women and girls are perceived in the United States, and we did more work with them through the No Ceilings effort, to have a look at this question across the world.

And pretty much in every major media market, media targeted to children has the following dynamics: female characters are five times more likely to be defined by their relationship to men than men characters are. Men characters are more likely to be defined by what they're doing. In no country is there a parity between what female and male characters wear in cartoons. Now, that may sound like a laughable point, but it's pretty important. Think about that. In no cartoon market anywhere in the world do female characters wear as many clothes as the male characters do. So what sort of pernicious message does that send?

So we have been working at the foundation to not only help standardize and illuminate some of the data that we think is important, some of the insights that we think are important but also to help catalyze filling some of the data gaps, so that we not only have a view about what our challenges are here in the United States but hopefully to empower people in other countries to really understand what the contours of those challenges are there as well, because this something that we need to solve on a global basis.

Catherine Bertini

Lt. Governor Reynolds and then Robert.

Lt. Governor Reynolds

I think the data is important also. Because we have limited resources, and so we need to make decisions based on the data, and that gives us a foundation to build from so that we can take that, look at the statistics and really make a difference with the programming that we're offering. And it is about raising awareness, so we did the hour of code to challenge school districts all across the state to participate in whatever program it might be.

We held our press conference at the capitol. I had a seventh-grader, Megan Wise, who came in and actually stood up at the podium and talked about computer programming and the importance that it meant to her and job opportunities in the future. She went over and she had developed an app, and she changed the app during the press conference, and the media was just in awe of this young girl's expertise and her willingness to stand up and talk about how important it was to have these skills and the impact that that had on her future going forward and her other friends.

We had another young lady up in Sioux City who, they didn't offer computer science, and she had a passion about it. Got a petition, went to the school board. They now are offering computer science in that school district. So it's about empowering and it's about providing opportunity and it's about raising awareness.

Robert Fraley

Let me shift the conversation just a little bit, because I think we all agree that, first of all, we don't have enough people in STEM, we don't have enough women in STEM, and we know we need to build systems that provide that encouragement.

If we shift to the other side of the story of women in agriculture and food production, we also recognize that, and I had a chance to hear just the incredible story at lunch today from Sir Abed and wonderful story of empowering women farmers. In many parts of the world and particularly in Africa the majority of the farmers are women.

And I think it really also illustrates the importance of another part of STEM, which is what technology can do to help empower women. I'd just like to spend a couple of minutes on that, because it's something that I can remember from some of the earliest conversations that I had with Dr. Borlaug, the importance that bringing technology to farmers can have in order to improve and empower their lives.

So, you know, just an example, a farmer here in Iowa growing a corn crop, because of the technology and tools will spend about ten or fifteen minutes controlling their weeds in an acre. And an acre may be about twice the size of this room. If you're a smallholder farmer in Africa and you're hand-hoeing and picking weeds by hand, he may spend two or three months controlling weeds in an acre. And technology can make a huge difference—you know, better seeds to improve yields, to raise profits and create the opportunity for education and continuing the cycle. But I think what it really comes to, to data science. Although my background has always been in biology and producing better seeds, what I've seen is that the data science tools are going to

be truly transformational to smallholders, because that connectivity through the cell phone is an incredible opportunity for education and for understanding the world and providing opportunity. And I think Norm always used to say—if you bring the tools to help a farmer, it's a double win, because farmers are among the poorest in the world, so it helps address poverty, and they're also some of the most undernourished and it would address hunger. And I think if we bring technology that empowers women, I think we take that really to a new dimension in terms of that sustainable impact for the future. So I think technology has an incredible role in unleashing and empowering women farmers around the world.

Catherine Bertini

Right, and we need more women in leadership so there can be more communication with those women farmers, because often that's where we have a big cut. Michiel wanted to say something, but before you do, Michiel, there's a question that I think would be appropriate to be part of your next response. And that is that we must address… This is from Wanjiru Kamau-Rutenberg. She said, "We must address the demand side of women's leadership in STEM. Are institutions conducive to women thriving in STEM careers? We just heard some examples of institutions, meaning schools maybe not being conducive; but what about Silicon Valley companies, for instance."

Michiel Bakker

I think we still have a long ways to go. As you probably know, that unfortunately, a very large part of our engineering workforce is still male with definitely male culture characteristics. But the good news is we're very aware of that and working very hard on changing that. But you don't change that overnight, unfortunately. This is not where you'd say—we know it needs to change, we're going to change overnight, and tomorrow is going to be a different day. That takes time. It takes time on everybody's side. I think that is one.

I think the second one is, by just having a much broader and diverse workforce, things will change as well.

So we acknowledge as an organization we have work to do. We're very concerned about this. Give us time. Work with us.

Going back to what I've heard so far is I think there are two elements that we can add to the discussion as well. I think that we need to speak the language of elementary school students, middle school students and high school students. We need to speak their language and what actually resonates with them in their world. So what we might be talking about today does not necessarily resonate with the middle schooler. They have different interests; they don't see the world in the way we do. And therefore we need to find role models as well in that new generation.

If you think about how the new generation is using technology, whether it's the YouTube, they use stuff on YouTube that probably you and I would never even

imagine is possible. And therefore we need to figure out ways to connect with them in their own environments and actually showcase to them that it's not about STEM in itself, it is about their future aspirations and what needs to get done in order to be able to fulfill your aspirations. And I think whether it is making a better social impact in the world, if that's the starting point, show them actually how technology can help them to accelerate their impact but don't necessarily focus on, to a middle school audience, you need to be interested in STEM because it's good for you and it's good for the future.

Chelsea Clinton

[inaudible] done tremendously well, I think. I mean, I was so proud to be part of the Made With Code launch in New York City with Mindy Kaling, and Girls, Inc. was strongly represented there, and you clearly have such a focus on getting the message and the messenger and the medium right. So I am grateful that you're doing that, and I think that your leadership in that area is bringing other companies along.

Catherine Bertini

We've got a couple more questions I want to get to from others, especially from some of the younger people who are writing in. There have been a couple about agriculture and its relationship to STEM, but also one person, Mikel Wright, said, "How can a young agriculturalist like myself communicate to the public concerning common misconceptions about agriculture?" And I think, not knowing all of what that means, I would assume, since we're talking about STEM, that it also is—how do we convince people that these agriculture-related fields are worth going into for careers?

Mary Wagner

I think some of the things we're doing along the lines of working on this event in March, exposing when kids come into Starbucks, we're going to have five groupings. One of them is agriculture and coffee growing. One of them is coding, so they'll see social media, because that's also involving the same STEM career choice. So you have to expose them. I think we have to be relentless in showing them, letting them get their hands in it. Because just talking to them, I've learned, doesn't do it. We really need to find a way to immerse people. And so I'm committed to that, and I think we are as well.

Robert Fraley

Two thoughts on that. So first of all, I think the question provides part of the answer, that so much of the Dialogue that's going on today is going on on social media. So what I always tell everybody when I'm talking to any students or anybody involved in agriculture, a real part of our responsibility is to talk about what we do so that we not only build the understanding of what we do but the trust in what we do.

But let me tell you… This is a little bit of an out-of-school story. But a couple of years ago we acquired a large data science company right in the heart of San

Francisco called the Climate Corporation, and we were just thrilled to become part of a company that had the data science engineers. On the other hand, the concern was—how would they feel being part of an agricultural company, and, you know, down the street they have to compete with Google and Amazon for talent?

And what's been really intriguing to me… You know, David Friedberg, who runs the company, tells this story time after time, that he gets a great software engineer or a computer scientist coming in from Silicon Valley, and he says, "You know, you've got lots of opportunities. You can go work on the next camera app for the iPhone, or you can come with like the sixth version of Angry Birds, or you can come work for us and figure out how you're going to feed the world and save the environment. And I think there's a real call for technology and innovation that can change the world. Because agriculture is the heart and soul of food security, but the improvements that we can in agriculture in the future are key to enhancing the sustainability and the environmental footprint around the climate. And I think that's a very powerful calling for innovation for the future.

Catherine Bertini

Great way to put it. Lt. Governor.

Lt. Governor Reynolds

And it is about changing the classroom and changing the structure of the classroom, and that's one of the reasons I really like the high-quality, scale-up programs that we're offering in school districts all across the state of Iowa. Because kids aren't sitting in a chair being lectured to; they're working in groups, they're solving a problem. One of the scale-up programs is CASE: Curriculum, Agriculture, Science, Education. And what that has done for FFA chapters and the number of women and girls getting involved in that and the applied agriculture—we have 226 FFA chapters; we have 14,848 FFA members. That's an all-time high, and I'm proud to say that 43% of those are girls. And we're reaching into communities that don't have applied agriculture. And what's even better when we talk about leadership is, of the 43% that are girls, 60% are taking on leadership positions. So it is about everybody coming together. With the food and ag project that we were working on, it was bringing the food industry and agriculture, higher education, and then our FFA chapters and 4-H and bringing them all together to give children the opportunity to see where… These are great jobs, they're the jobs of the future, so we need to drive that passion early on, make sure that they have the skills and an interest in math and science and technology—and then that opens the doors. Then they're prepared to take on whatever career they so choose. But we need to continue to expose them to that.

Catherine Bertini

Mary.

Mary Wagner

I think the other thing, too, is having two girls and going through those high school years, you have to go to them where they're at, I mean, not just in this country but in other countries. Starbucks is all over the world, so I can tell you that's why we've hooked up on some of our social media opportunity. We can reach a lot of girls. So the idea is—what should the idea be? And we've spent a lot of time thinking about that, because we can reach these girls. If you like Frappuccino, you're probably on social media. We have the girls, and now we have to reach the girls with creative ways. So it's coming together—that's the beauty of what we bring.

Robert Fraley

You know, the best thing about working with Mary is that at your meetings you have really, really, really good coffee.

Catherine Bertini

One of the questioners has asked, "We're talking a lot about these things, but what are we each doing to hold ourselves, our companies, our state accountable for what we might achieve in this area? Anyone want to take a stab? Lt. Governor?

Lt. Governor Reynolds

Well, I'll start with that. I'm really proud of our state. This is a bipartisan issue, and so not only have we put the infrastructure in place with some very ambitious goals but this legislature has stood behind this initiative, and they've appropriated $5.2 million each year to the Governor's STEM initiative. And with that, I've been able to take that and go out to the private sector and to federal grants through the NSF and really leverage that. And we started out, we were able to reach about 40,000 students across the state. We're now at a hundred, and it continues to grow. And there are so many organic initiatives that are taking place because we're raising awareness; we're talking about the importance. It's what's going to keep us innovative and competitive and really address the challenges that face the world. And so from the state perspective, I'm all over the state, as well as tons of other people, talking about the importance of it. But the state has really put some money behind the program, and that's been essential, I think, in us reaching some of the goals that we've set.

Robert Fraley

As a company some five or seven years ago, we decided that, as we looked around the world, our single biggest challenge was being able to access the talent that we needed for the future. And so we've made STEM education our number one commitment. So if I go back, it is our major area of charitable focus. So we've invested in communities around the world, everything from helping to build scientific programs to working particularly in the area of fellowships where we can sponsor education programs. We've probably invested over $80 million in STEM. And I think that sounds good and I'm so glad we could do that, but I think one of the things in the

last few years, you know, having the ability to interact with other companies and institutions, there's really an opportunity to amplify and work with others to come up with even better and more powerful approaches. And it's something that again I go back to Dr. Borlaug. He recognized the importance of planting these seeds. And just before Norm passed away, he was really concerned about how will we continue that next generation of plant breeder to move forward in rice and wheat. And we've had the privilege of working with Texas A&M, working with Julie and sponsoring the Beachell-Borlaug fellows, and I'm proud that somewhere in this room and probably outside this room, we've been able to train over… there's a bunch in the back. You know, we've been able to train 80 fellows that help to carry on that mission. And I think again that's another form of amplification, because, you know, one of these young kids is going to be the next Norm. Thanks.

Mary Wagner

Yes. I'll just [inaudible] for Starbucks. We believe in education. Again, we offer free education in the U.S. if you work 20 hours a week or more. We believe in opportunities, those between 16 and 24 not working or not in school—they need to… They're women, too, they're girls. So this is just part of a broader humanitarian effort to reach out and give people a chance.

Catherine Bertini

One of the issues that's come up about STEM has been raised by the columnist, Fareed Zakaria, who wrote in March that the U.S. might be making too much of an issue about STEM because we might be forgetting the broader liberal arts perspective and how STEM really fits in and how that we can't just train scientists but we must train people who understand the broader connection. He even quoted Steve Jobs to talk about that these different important pieces had to be linked together, science with culture with liberal arts and that that's the only way to succeed. So how do we connect—maybe, Chelsea, I can ask you this question—How do we connect all the dots to be sure that we're promoting STEM and not forgetting the broader picture?

Chelsea Clinton

Well, I don't think we have the luxury to do either/or, candidly. I mean, I think that we must have an intensive focus on STEM for all the reasons that we've talked about, both more broadly and within our own organizations, as we just heard and as I spoke about in my remarks earlier. And yet I clearly think context is important; it's why I made a point earlier about kind of recognizing that barriers to female farming, full potential and participation, often exists outside of the value chain.

And so I think helping to train people, not only sort of in the disciplines of STEM but also kind of with the humility to recognize that these challenges, whatever the challenge right in front of us, whether it's food security or something else, exists in a larger context. I think that's really Fareed's point is that we can't not continue to cultivate in a critical thinking and through the bias towards collaboration. I mean, you

heard the lieutenant governor talk about how in certainly the problems here in Iowa, they're team problem solving based. And so collaboration, humility, critical thinking, curiosity are embedded in the training and mentorship, along with the STEM components. And so I think we all need to be working more in those intersections, but we can't lose our intensive focus on STEM because, as you heard earlier, we are so far behind and we have to catch up; but we have to make sure that we are catching up in a way that is good, not only to solve problems but hopefully preempt problems in the future.

Robert Fraley

Yeah, I think an important build on that that we've all seen. I've talked to many in the room about this. As a scientist, I originally come to this from, you know, science is absolutely the absolute critical component; and it's certainly essential for everything we do. But one of the things, you know, I've certainly learned as we've wrestled with agricultural technology introductions like GMOs or as we've watched society in different parts of the world not accept things like vaccines, or, you know, the debate that we still have on the science or the non-science around climate change. I think it points to the fact that science is an essential component, but the communication and the societal interactions that are so critical to build that understanding and trust—I think it really says to me that we can't do either/or. And even more, you have to bring them together.

Chelsea Clinton

Briefly to build on that, I think the academy, universities and colleges are really recognizing that. And so I know, because of particularly the vaccine challenge, for example, medical schools are now introducing communication, not only kind of bilateral communication between doctors and patients who are role modeling but increasingly kind of collaborative in community communication, recognizing that maybe a nurse or someone else might be in a better position to have a challenging but crucial conversation. So I think to your point, that's something that not only companies are recognizing but kind of the pedagogy is recognizing too.

Lt. Governor Reynolds

I mean, it needs to be reinforced in every single class, and you'll have kids tell you that—when I go into history, I want the STEM subjects reinforced in that, and literature, whatever. I mean, they need that interdisciplinary process.

Catherine Bertini

I heard an impassioned speech recently by the president of Le Moyne College in Syracuse, a Jesuit University. And she said, really what's critically important is their base in liberal arts, and no matter the person was in science or computer technological or anything else, that if they had a broad liberal arts base while they specialized in program X, that then they could go on to graduate school and really specialize with a really strong base behind it. It made sense.

We have a question from a young participant named Allie Sauerig. (I'm sorry, Allie, if I didn't pronounce your last name right) And she says, "Two days ago my 11-year-old sister came home from school extremely upset. A boy in her science class had laughed at her and told her, 'Girls can't do math and science.' Now, my sister knows this is completely untrue, but she didn't know how to respond to him. How do you suggest that girls like my sister assert their right to participate in STEM to people like the boy in her class, and what can I do to help girls like my sister?"

Chelsea Clinton

I imagine you all have strong views on this. I'll go first, and then I hope others will chime in. As someone who was on the receiving end of some of those same messages a long time ago now, I would say, one, your sister, Allie, should keep working hard, and the best revenge is success. So if she keeps working hard and does better than he does, that to me is really the end of the conversation. But at that moment, I think it's important when we all have those moments, to recognize that kind of—he is saying that, because he's intimidated by her. I mean, that comment, that bullying, effectively—because I think it's important that we call it for what it is—is about the bully. You know, Allie, it's not about your sister. And so I would hope that the next time that happens—because, sadly, there probably will be a next time—that she can recognize, that is not about her, that is not about her potential, that is not about her brainpower, that is not about how well she is going to do on her next test. That is about him being intimidated. But if she does feel like she has to respond, I would just smile, because I find kindness is always the best response to nastiness and say, "You're wrong," and walk away—and her test scores were ultimately prove her right.

Lt. Governor Reynolds

Well, that's what I love about getting these young girls in the programs, whether it's First Tech Challenge, Project Lead the Way, CASE, because then they don't rely on somebody else to define who they are as a person or what they can do. They actually can see for themselves that "I'm good at this." I've seen it. It just builds a tremendous confidence in themselves, and it gives them the ability to just not give that any thought but to succeed and to do better, and that is rewarding in its own. But I mean really, so we need to start it with these young girls at a younger age and have them build it within themselves, to find that they have the passion, to find that they're good at what they're doing and they can do it. And especially, you know, a lot of our young kids and young women don't have anybody at home telling them that they can do or be anything that they want to be. So it's imperative that they have the opportunity to find this out for themselves. And I've talked to girls participating. I said, "Did you ever think you'd want to go into engineering? Was it something you'd like to do? Did you think you'd want to be…?" I tried to talk to my little four-year-old granddaughter. I said, "So Avery, do you want to be a scientist or an engineer when you grow up?" and she says, "Well, Grandma, really I want to be a farmer." And I said, "All right! You go be a farmer and discover the hybrid to solve the world problem." But let them decide for themselves that they have the skills to do it. Then they can make those decisions.

Catherine Bertini

Okay, we just have two minutes left to stay on time, so I want to ask a question with a quick answer to each panelist. Michiel, I'll start with you and maybe, Chelsea, I would ask you to end. So I'll answer my own question before I turn it to you. Okay? And here's the question. We've heard about how important it is to reach people in fourth grade, third grade, fifth grade, junior high school. It's a great commercial, by the way, also reaching people in high school for the Youth Institute here. Are you Institute members here and would like to stand? Not yet. We'll see them soon.

But here is the question: "Michiel, was there something important that happened to you, and if so, in what grade, that brought you to this place today? What one thing turned you on to your work."

Michiel Bakker

My parents. It's my parents from a very young age who made clear that they couldn't care less about what you were going to do if at least you had fulfilled your own potential. And they actually, they kicked me in the… for a long period of time to really do what I was actually going to do. But they believed in me, and they didn't prescribe to me what I needed to do.

Catherine Bertini

Mary?

Mary Wagner

I think it's the same. I think my mother just… it was a never a question that you would go to college. It was never a question that you wanted to go on for a PhD. I mean, I was the first for many things, but it was never made a big deal either—it was just an accepted fact that, she's going to do that. I think I just want to make one point. I take my girls to work. I don't know if people do that. But I always take my girls to work. They run around—sometimes that distresses me—but they're working in the lab, and they're happy as can be. I think you need to show them. That's the most impactful thing a woman can do is bring the kids to work, because that'll go lifelong in terms of effect.

Catherine Bertini

Lt. Governor.

Lt. Governor Reynolds

Well, I'm number three with parents. My dad right out of high school went to work on the floor at John Deere and I just… he instilled a tremendous work ethic and just really made all of us kids believe that you could do or be anything that you wanted to do. And he rose up the ranks, but it was from hard work, and so I just always felt that,

no matter what, if you worked hard and had a passion about what you wanted to do, you could go for it.

Robert Fraley

I'm probably one of the weird ones. I'm one of those kids who… I can remember when I was five or six years old I knew I wanted to do something in science, so I was always trying to fix stuff or take things apart and trying to get it back together. And I think what really turned me into a scientist, though, in terms of thinking was I went to a small, rural high school in Central Illinois. I think I had 18 kids in my graduating class, and I think I was the only student for one really gifted science teacher in biology and chemistry and physics. So I got a lot of attention those last couple of years. And it really got me to the point to where we had enough time we could really have deep conversations about science and what it means, and that changed me.

Catherine Bertini

For me, when I was 15, because my father was active in politics, I was invited to a five-day session at Colgate University for young people interested in government and how government works. And I left absolutely committed to government service and to try to make a difference.

Chelsea Clinton

I think for me it was both my parents and my grandmother, my mother's mother who lived with us toward the end of her life. And I think about her every day. She passed away almost four years ago—it'll be four years ago on November 1st. And she had this adage that, *Life is not about what happens to you—it's about what you do with what happens to you.* And my parents inculcated in me kind of that what happens to us is also kind of our perceptions of the world around us and what we are going to do about them or not do about them. And I'm so grateful that from an early age my parents expected me to have an opinion, expected me to be able to mount an argument about my opinion for what I wanted to see change, and expected me to be able to go out and at least try to make a difference. And as you heard in the introduction from Ken, I recently wrote a book called, *It's Your World* that is targeted to 10- to 14-year-olds about some of the big issues in our country and across the world and also how some kids and also some older people—I do admittedly talk about GMOs in the book—are helping to solve our problems.

Robert Fraley

Does the scientist end up helping in the end?

Chelsea Clinton

The scientists end up helping in the end.

Robert Fraley

We need a few more movies like that, too.

Chelsea Clinton

I agree. But I do… I just want to end with this. I did… When I was five years old, I wrote a letter to President Reagan, because I had learned from reading in the newspaper that he was planning to go to Bitburg Cemetery, which was a national cemetery in Germany at the time; and I didn't think an American president should go to a cemetery where Nazis were buried to pay his respects. So I wrote a letter to President Reagan, and I said, "Dear Mr. President, I've seen the *Sound of Music*. The Nazis don't look like very nice people. Please don't go to their cemetery. Sincerely, Chelsea Clinton." Now, I never heard back, even though I'd included my favorite stickers in the letters as a gesture of goodwill. But I had tried. And my parents made me feel equally as good about trying as if I'd actually gotten a letter back or if President Reagan hadn't gone to the cemetery—because he still did go to the cemetery. And, you know, Mary was talking about her daughter. That's something I'm so determined to instill in my daughter, that it's always better to get caught trying to make a difference in the ways that we feel called to do in the world.

Catherine Bertini

Before we thank the panelists, let's give ourselves a charge. Mentorship is an important part of what was just said now and was said earlier in this panel. So could everyone in the room make a list to yourself of the girls and the boys in your life who you want to reach out to, beyond those in your immediate family, because presumably you are already reaching them. And you make a list of those whom you're going to mentor, who you're going to help move into their preferences for STEM in the future. And next year maybe you can report back on how well your mentorship is going. Please join me to thank the panel for this fascinating topic.

Ambassador Quinn

Wow! That was sensational! What a great opening. Don't leave. We're going to move on to the next session. You don't want to miss that. So, Chelsea, before you go… Thank you again for a wonderful inspirational… Let's thank Chelsea Clinton once again for that.

Chelsea Clinton

Thank you.

Ambassador Quinn

We talked about STEM, and some people say it should be STEAM with the A for agriculture or the A for the arts. But I have a new book here just launched, called, *Hamburgers in Paradise*, written by a woman, Dr. Louise Fresco, who is here, who is probably one of the greatest agricultural scientists, who has incorporated the story of food and the arts together. So thank you again.