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## *Putting It All Together*

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PANELISTS:

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*University of  
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ANDY HEDGECOCK  
*DuPont Pioneer*

TONY SHELTON  
*Cornell  
University*

**Pueppke:** This panel will be different from other panels in the sense that I asked the panel members to join during the conference rather than determined the panel composition ahead of time. Two of them were speakers, Greg Jaffe and William Kerr, and there are two individuals who were not formally on the program, Andy Hedgecock from DuPont Pioneer and Tony Shelton from Cornell University.

We want to have a very interactive, informal conversation at this point. None of them are going to give you monologues. There are no PowerPoints. We want to talk through some of the issues that have popped up over the last couple days. We want to think about the future in particular and in particularly how NABC can help us collectively take some concrete steps forward.

My television set broke in 1979, which is before most of the students among you were born, and I never replaced it. So I don't have a TV set at home, but once in a while at a conference after a long day, I turn on the TV in my hotel room and I look for something totally mindless to get my mind off of the deep conversations. The first channel on the system here in the hotel is HBO. It is channel 2, and up pops a sign that says there is a show called *Vice*, and I thought that this is some awful thing in Philadelphia and they are going to show vice cops. Did anybody happen to catch that last night? It was about GM crops, a story about one of the technology providers, the one where the first letter is an upside-down "W," and the impacts on agriculture and on the world. And all of the issues we have been discussing—framing, societal, technological, and trade issues—popped up in one way or another in that little 15-minute program. And it showed me that these things we have been discussing for the last couple of days pop up everywhere, and you can't even go to your room to get away from them.

I encourage all of you to break in at any time to answer the questions if you want to. The panel up here is meant to stimulate the discussion, but we want to make this very interactive. It strikes me that we have many people in this general dialogue who think they are right. This morning we heard a lot about consumers and people with strong opinions who think they are right about how trade should occur or how technology should be used or the messages that we should be sending to consumers. This is the background on which we are operating, and my question is, how we can advance a dialogue when everybody has these strong opinions and thinks they are right. And it seems to me that this is a question for a lawyer. Greg, that is you, and you have been part of AC21, you have had those interactions. Do you have any thoughts on how we can move forward given the players and their strongly held, often conflicting views?

**Jaffe:** I am not sure why this is a legal question, but I want to mention a couple of things. One is increased transparency. That is always a positive approach. The more information people have about everything, the better it is and the more transparency you have. I would say that is an important part or an important principle that needs to be part of it. As Bill Hallman said, the debate is framed by people on both extremes who are very vocal, but the vast majority of Americans and consumers fit in-between and don't necessarily have very formed views on this issue.

The second is that I think there is an opportunity for that middle group to be educated in spite of what the extreme groups say, and in spite of what some of the panelists said this morning, I still believe there is an opportunity to educate, and I see that daily in my job. I have spoken at three different Dietetic Association meetings to nutritionists and dieticians who respect CSPI, and I am giving them a different perspective on ag-biotech. At first I saw some raised eyebrows, but then they began to reassess what they had previously thought about that. So with the right audience and respect for the person giving the message, I think you can make an impact. And I am sure Tony Shelton or Margaret Smith from Cornell will tell you that they have impacted the local audiences who respect Cornell scientists. I think part of it is having the right messengers and respect.

The third part, which I think has been missing from this conference, is ag economics. In the end, people largely are economic actors, and I think that for all three issues we have dealt with during this conference there are economic implications and ways to portray them as a win-win propositions.

- *Resistance management* may not pay off in the first year, but the economic data shows that by the second and third year, all of it does pay off. Farmers need to consider that, because in the end they need to take the long view.
- The *trade issues* about regulatory approval, etc., are all about the economics; if planting a crop is beneficial, then there is a way to make that a win-win for both parties in those disputes.
- Similarly with *coexistence*: Biotech farmers get benefit from doing it, as do organic farmers. There should be a way to get a win-win economically for both sides,

and I think we have not stressed that enough. Instead of looking at this as yes or no, right or wrong, black or white, we need to change the dialogue among these groups toward how we can move it to a win-win for everybody. I don't think you will ever capture the people on the extremes on both sides, but I think they don't necessarily speak for the vast majority.

**Kerr:** One observation I've made in the last few days is that all of us really are people of the scientific method. We all struggle with people who don't believe in the scientific method or for whom it doesn't make sense and whom we have no way to influence intellectually. So if you are trying to figure out how to bridge that gap or how to reach them, how to win their hearts and minds, I don't think we can actually reach them through science.

**Pueppke:** Andy, how do you approach this? You have a very different background based on where you work.

**Hedgecock:** Speaking from the industry perspective, industry has been somewhat silent over the last two decades, thinking about their customers as only being the farmers and maybe also the regulatory community, and not focusing on the "public." In the past I don't think we would have been open to having that conversation with the public. It is messy and it didn't go too well, and we need to be alert and worry about so much of it not going well. We need to prepare better. We need to be humble. We need not to be arrogant. We need to be open to that conversation, but the important thing is we need to engage. And it is not going to be a single, leave-behind publication, item, or website, whatever it might be. When we talk about resistance or acceptance, etc., we need to include many perspectives, many facets, and it is not two-sided either. It's multiple-sided. There are multiple facets in terms of people being supportive in some aspects and not in others. So we need to hear all those voices and we need to have more groups like this, where not everything is totally like-minded and equal. I really have liked the idea of having organic growers in these kinds of conversations, because one of the topics that came up today was that the activists and the "anti-ists" are very persistent, coordinated, and strategic. I want to learn from them. Maybe not exactly replicate what they do, but I want to learn from them, e.g., can we show that the Chipotles of the world and their message about not using biotech is pure marketing? So rather than being silent about it and letting the public's opinion crystallize around that issue, I like that there were many alternative approaches suggested in the meeting. I think the tide is turning, but as it is turning, it will get messier in terms of our engagement and our conversation around the benefits and the limitations. That is a big piece, too, that industry has neglected to talk about. We have all been big on the positives but we need to also talk about the limitations. Let us be transparent and let us be real.

**R. Connolly, Penn State:** This is my first NABC meeting, and I was wondering if you ever considered inviting a Chipotle representative, an anti-GMO person, to come and give their own point of view?

**Pueppke:** We have in the past. NABC has avoided taking on the really far-out extremes, but thoughtful people who are willing to listen and are respectful and present other viewpoints have been in the room. NABC 15 in Seattle would have been a good example of that.

**R. Hardy, NABC:** NABC 15 in 2003 was the most accommodating to GMO opponents. Charles Benbrook proposed that he be given one of the sessions and be able to select his own speakers and to chair that session. We agreed to that. We gave the anti-GMO activists a forum integrated into an NABC meeting. We usually aim to have at least one questioning person in the opening session but I am not sure we did that this year. Kathleen Merrigan presented all sides in her keynote presentation, so we may have been remiss in this meeting in not having an outspoken critic on the program.

**R. Connolly:** This is my own personal experience: I work in the animal and dairy industry, and we invited the Humane Society to come and talk to us, and that was very uncomfortable but also very informative.

**Shelton:** I think the dialogue is actually changing. How many people saw the *Daily Show* with Jeffrey Smith? We should see that. Google the *Daily Show* and Jeffrey Smith and you will see this incredibly candid presentation where Jeffrey Smith, who is one of the premiere opponents of biotechnology, says that he is not a scientist. He doesn't know anything about this. He is just plain dumb and asks real scientists questions. Then there may be a Cornell plant breeder there who handles this remarkably well. Many of you are under 25 or 30, and where do you get most of your news? On the *Daily Show* and the *Colbert Report*. And check out Dr. Oz as well. So the strategy is changing for communication. *National Geographic's* March 2015 cover story was "The War on Science." I grew up reading *National Geographic's* reports about the Amazon, things like this. But today, they are taking this story on. On the cover they give five examples of the attack on science:

1. Man never landed on the moon. You know that was all staged.
2. Evolution didn't occur.
3. Vaccines are causing more problems than good.
4. Fluoridation of water is also a problem.
5. GMO's are not safe.

Not everybody reads news magazines like *National Geographic*. If *People* would take that on it would reach more people. I think Margaret Smith really asked a fundamental and frustrating question that I know many of us at land grant universities have: When we are asked to talk about biotechnology, how do we get our message across? That is really, really difficult.

Wegmans, a supermarket in the Northeast with about 75 different markets, is so advanced that they started a consumer affairs bureau. They were the first supermarket to have this, and they have loyal shoppers and this buys their loyalty. Wegmans contacted us back in 2000 and told us that some of their consumers were coming to them and asking about genetic engineering. Cornell put a brochure together for consumers who had a question. It was very basic. What is genetic engineering? Why is it being done? What

crops are being genetically engineered? Is it safe? We printed 100,000 copies for Wegmans to pass out to their customers, who could write to them with follow-up questions, which they sent to us to answer. One of the ones I remember most clearly was a woman who asked why all these grapes were genetically engineered. And not to tell her they were not because they were big, plump grapes and when she bit into them she could taste that they were genetically engineered. Taste bud analysis! We still contact Wegmans every year to see what the concerns are. Microbial contamination of fruits and vegetables was more of a problem in 2000–10. But around 2012 anti-GMO issues started exploding because of activist pressure. Wegmans took the bold step of putting something on their website in 2014 with the perspective that the crops out there are safe, but that they also offer alternatives, like organics, if people wanted to avoid GMO-containing products. I spoke to our contact there about two weeks after they put this on their website. We had helped them develop the content, since their original draft, while meant to be balanced, contained some GMO bashing. We were told that they got absolutely blasted. Some people wrote that they used to trust Wegmans but don't anymore. Over time the comments and questions became much more balanced. So things are changing. It takes bold moves by groups like Wegmans to get this out via websites or through newspaper reporters, such as the *New York Times's* Amy Harmon, who has done some really nice work on biotechnology. So the conversation is changing, but we are still in the minority, and we still have our backs against the wall on this. How can we get out and be more proactive?

**Hedgecock:** How do we draw in folks who are either neutral or negative on the subject to this kind of session? Industry and universities can invite them to have this conversation. Bill Nye the Science Guy was kind of neutral, trending negative. Then Monsanto invited him in for a conversation, and after that he wanted to spread the news about this issue of GMOs. He engaged journalists who are open to hearing and talking and writing about it. As scientists we have been afraid to engage journalists. If we start to have conversations and relationships with journalists and provide them information, they will turn to us if they need a reliable source. Here is another example: I was at a workshop, *Public Interventions in Life Sciences*, this last month in DC, talking about the public trust in science, and I found out that the American Association for Advancement of Sciences is looking into going to museums and science organizations within larger communities or cities and having these conversations and engagements. So one of those things we can do is to invite people to seek out such programs, try them out, and take it from there.

**Jaffe:** I was just going to add about Wegmans that if you haven't gone to their website I would recommend everybody go and read their frequently asked questions. I was, like Tony, a reviewer for that site and made some comments, and I think what makes it so persuasive is that it is very factual and written very much with their philosophy of marketing in mind. Danny Wegman is an organic farmer and lives on an organic farm, and so they felt very strongly they should support all farmers and that all farmers have difficulty with producing and marketing crops. But while he lives on an organic farm, he also feels very much for the farmers who aren't organic, so he can be very persuasive to Wegmans

customers. Wegmans doesn't just print and reiterate what Grocery Manufacturers of America (GMA) says. They actually looked at why it is important to their customers

**Shelton:** Wegmans really promotes organic as well. You don't find many GM and organic labels, but they are against regular consumers paying extra for the label. They say that if things are labeled GM-free that is enough, that serves a particular market equivalent to the organic market, but it avoids having labels that mean additional cost to the consumer.

**R. Hardy:** It is tough to fight the wars of the past. I am not sure how much we gain by continuing to fight those wars. We need to focus on minimizing the future negatives and maximizing the positives. We have heard that stacking herbicides is going to be good for the short term and not so good in the long term. Do we collectively have any recommendations in terms of herbicide stacking? Tough issue, but do we have ideas?

**R. Roush, Penn State:** I really would want to see the justification of particular stacks, because the experimental data clearly shows in specific examples that there is a problem with mixtures of pesticides and herbicides of any kind. It is a deceptively simple strategy: Surely if an insect or weed is resistant to one, you can kill it with the other. But the devil is in the details. We haven't seen the details. Experience with rye shows that you can make both pesticides fail in exactly the same time if you use them as a mixture. That is to say, they may work for a five-year period and then both stop working. You lost both of them. There is no improvement over using one for five years and then going to the next. The potential is that this strategy actually knocks the herbicide out faster rather than the resistance. The nuances of it are very critical, and I don't think this has been fully appreciated.

**Jaffe:** And we got a good dose of that in the luncheon presentation with John Tooker—I mean in a good sense. I challenge the people in this audience to raise their voices. I work in Washington, where some of these decisions are made, and they don't hear enough from scientists and if they don't hear from them about these issues, then the voices they hear are only the voices of industry. I can give the example of the *Bt* corn rootworm framework that Jack talked about very briefly here. I looked at the docket and the comments in that docket: all the farmers are against it, and all the industry is against it. My comment supported it, as did some academics who submitted comments. I made a lot of phone calls to academics and asked them to submit comments. That will be helpful. I understand everybody is busy, but as somebody who has worked at the EPA, actually wrote a rule and looked at and reviewed those comments, I must tell you that they are very, very helpful to the people in regulatory agencies, the scientists who want to do the right thing but need the support in those dockets to do that. I strongly suggest that when you have relevant scientific evidence you provide that to the agencies, provide those points of view, because they do help in the decision making.

**D. Mortensen, Penn State:** I appreciate that comment, Greg. I would just say that as a person who has committed a lot of time to doing just that on the issue of stacked trait herbicide-resistant crops, there is within the science community a pretty strong push-back and rounding of the wagons because they want to have one voice on the way we

do things. I can tell you that from my own personal experience and that of some of my coauthors that having an outside view on an issue may get you mentioned in scientific publications, but then you find you are no longer invited into the discussion when a group of scientists are making decisions or recommendations. It is my view, after reflecting on this for the last three to five years, that the science community needs to really open up and have a conversation about data and the biases that go into the data we collect, the data we leave on the table, and the data that we never even collect. My view is that the science community has not been very frank and open to having these discussions when there are alternating views on some of these subjects. I think my colleagues would agree.

**C. Mallory-Smith, Oregon State:** I want to follow up on that, and I guess I have to echo what Dave has said. I will speak from the Weed Science Society's perspective. There is a lot of push-back for anybody who is outside the main stream in what you want to present. I think Dave and I could both comment on that, and I believe strongly that there was a lot of input given on some of these considerations within the regulatory system from scientists, which has not been acknowledged or recognized among all the other overwhelming positives they received from an industry push. I mention this because many of us commented on 2,4-D stacking, which is actually a really bad idea if you want to talk about resistance management, because 2,4-D is not going to control grasses. My prediction is that we are going to see a whole bunch of resistant grasses come out of that system. But I do not think it is because that information wasn't given to the EPA.

**Pueppke:** Let me raise another point related to Lynn Clarkson's comment about the consumer, the customer and making sure that you deliver to the customer what the customer wanted and or needed. A couple of other people from the business side agreed. We also heard it from Cargill. I have spent my whole life in universities and I have sat through a lot of job interviews where we have interviewed administrators and deans and other leaders in what my college used to call Life Science and Natural Resources, the focus of the land grant system. I don't think I have ever heard anybody talk about the consumer being the customer. We internally justify ourselves in my recollection in two ways:

1. There are starving people in the world. The population of the world is growing and we have got to feed people.
2. There is great allegiance to the agricultural production community. People who produce the materials that in turn make the food one way or another.

I think these are different ways of looking at the world. And at least where I live, in the university, we don't think about it the way some of the major players think about who we keep an eye out for, who the ultimate customer is. Does anybody have a perspective on that?

**R. Roush:** I think that our primary obligation is to the public sector, looking out for the best interests of the farmers. It is often claimed by people in industry that they have the biggest interest in managing resistance because they have the most to lose. A simple little bit of bookkeeping will show that that is not true. If an individual land owner is going to use any chemical, industry will want to get profit out of it. The companies share in the farmer's

profit. It is the collective weight of what the farmer is going to lose. This happens time and time again, where the collective weight of what the farmer is going to lose is much greater than what the company is going to lose. We have examples of that in the cotton industries in Mexico and Northern Australia. When the company left, farmers went out of business, just walked away from the land. The challenges of business really weigh heavily on the land holders, not on the companies involved, so that has to be our principal concern.

**R. Giroux, Cargill:** In our case we have two customers. We have the farmer customer, and our goal is to help farmers prosper. We also serve almost as middleman to the next customer, the brand food company, the grain manufacturer or the export customer. So we are in an interesting position, right? Two customers, generally they want the same thing, but they don't always. That is why you see a company like ours get into this position of having to give all customers what they want. We must be flexible. But it never changes the fact that we are always going to advocate first to help the farmers prosper, then give the other customers what they want. That is a difficult situation to be in.

**L. Clarkson, Clarkson Grain Company:** I echo what Randy said. We have tried to find out what the customer on the buying level wants, relate that back to the farmer, and it only works if the consumer is willing to pay more for some differentiation.

**Shelton:** Working at a land grant university, I think about who my customers are. I have had some discussions, and it is somewhat of an unpopular view, but I say my customer is not the farmer. My customer is the public, the good of the public, and I work for the public good through farmers by trying to get them to use better practices that are safer for the environment and produce better food for the general public. It is always easy to say that we work for the farmers, but that doesn't sit right with me. I work for the general public. When we think about this technology, move this technology along, and we know that scientists and universities get grants and publications and graduate students, things like that out of it, I sometimes I think we lose the focus of who our public really is.

**Pueppke:** I have been with land grants at least half as long as Tony has, and it is very interesting, because for a long time we in agriculture—I use this term very deliberately—bellyached that society didn't care about food and agriculture. It was all taken for granted, and nobody cared about us and nobody gave us any money and we didn't have any rent money. Then about ten years ago society woke up, the food movement came along, and suddenly we are hearing about local food and organic food and all this other stuff we are talking about here, and we started bellyaching again. They don't see it the way that we do, their opinions aren't based on science, and we are trying to do something and they don't like it. But we don't want to listen to them. We want to do what we want to do. I guess I am betraying my view that we need to do an awful lot of listening in the land grants about what society wants, even if we don't have to do everything they want. We have perspectives and skill sets that are pretty unique, and I think we have a great opportunity now that there are people who really care about food. Most of those people don't come from an agricultural background. They are not science-literate. Most of them would

disagree with people like me on a lot of details, but the good thing about the university is that it is a comfortable place for those discussions. It is a lot harder in other venues to do that, and my recommendation would be that the contribution universities can make is to provide a public forum for those discussions.

**T. Harding, Lehigh Valley Organic Growers:** I have always looked at this issue of client or customer or student in the sense of that they are all members of a community of stakeholders, and I see no need to define specifically who the client is at this point as long as we remember that all of us are stakeholders in this discussion, that all of us are very much involved, and whether this is good or bad science, we must communicate as stakeholders. The new corporate model looks at every member of the chain as a stakeholder, while the old model only dealt with shareholders, those who hold stock. I think we are now looking at a very different chain. We are looking at a shift in some of the business schools we have had a chance to speak at, we are looking at a committee of stakeholders, and whether we are on the academic side or on the business side or the student side, or for that matter the ultimate client side, we all are stakeholders, and I think we need to think differently about how and to whom we communicate.

I want to pick up on one other issue, and that is the businesses that have really bought into serving the stakeholders environmentally, socially, and economically. These businesses are much more profitable than those which abuse the rules, who don't care about stakeholders, and who really don't care about who the client is. The land grant system for me was a very special place. My extension agent was my best teacher. Today I probably couldn't even find an extension agent, and that is a shame. I had a meeting with the dean at North Carolina State University recently and told him that he needs to start listening to the whole of the stakeholder community, to remember the mandate of the land grant. That there is a great opportunity at the university, and to open it up to all stakeholders. Don't worry about what they are or are not going to say. By all means, keep the extreme right and left out of the situation as much as you can, but make sure you are listening. The biggest problem I have when I talk to a client or to a member of the academic community is that I'm not even sure if they are listening. Sometimes we don't listen well enough to really hear the message the stakeholders are telling us. So I would suggest that we open it up. Transparency is the new word. Authenticity is another new word. And I think it is really critical that we look at it as a community of stakeholders and that we look at it as doing work for the better good of all.

**R. Welsh, Syracuse University:** I just want to say two things. I came out of the land grant system. I got my master's degree in social economics from Florida and my Ph.D. in rural sociology from Cornell. I have worked for USDA and for not-for-profits. Now I am working at a private university. At Syracuse I was hired to start a food studies program, and my students are passionate about food. They want to know everything, and a lot of them have come in with the Michael Pollan bias, as I'll call it. Or they saw the film *Supersize Me*, but they are still very, very smart, inquisitive people. My feeling is that the reason we see a lot of these food studies programs popping up in private universities is that we are cutting the social science programs in the ag schools around the country. Rural sociology is a skeleton of what it was, and I see it get pushed down here just to pop up here. I don't

like a lot of what goes on in food studies programs. The humanities really don't have to be as careful, they don't have the same background and they aren't as well versed in the issues, but they are not lacking in confidence. I find that troubling and problematic.

**Pueppke:** We have some students sitting in the back there. Did you all come from farms? Anybody come from a farm? So most of you didn't, right? There's a whole bunch, so what brought you into agriculture?

**D. Perry, Penn State:** I am actually from food science, and when you were asking about who is our target, who is the consumer, from the perspective of food science the consumer is ultimately right. Unfortunately the consumer gets what the consumer wants, and that is what drives food science. It is not always the way we want it to be, but that ultimately is how it ends up being. Unfortunately, what consumers want, they don't actually always realize, so they have a mental image of what they think they want. When we then do the sensory tests, results show that things are complicated. What they think they like and what they actually like can be two completely different things. So in talking about what is best for the grower and what is best for the consumer, they can be on par with each other or they can be on completely opposite ends of the spectrum, and sometimes the consumer doesn't even realize that. So unfortunately as much as we want to believe it is black and white, there is a lot of grey. What I like in the morning might not be what I like in the afternoon, so even within one person preferences might change; and so when we are talking about the ultimate goal we are after, unfortunately it is going to shift. It is going to evolve, and establishing a system that is more open to this and opening the lines of communication I think are going to be most beneficial.

**Pueppke:** Very good. Can another student tell us why you are in agriculture if you are not from a farm or food sciences?

**M. Hanlon, Penn State:** I am in plant biology at Penn State, I think there are five of us from plant biology, and we are very basic researchers. My background is biochemistry. I happened into plants and agriculture because it was fun. It is more fun to do research on plants than it is to kill mice. I enjoyed that more, and then I found that there is a lot of opportunity for research. There are a lot of questions we don't know the answers to. Plants are interesting to do research on. And I think for a lot of us being at this conference has been eye-opening. There are things I never think about. I only think about consumers because I am a consumer. My friends are consumers. My friends approach me for opinions on the things in question, but I think my being here has taught me that there is something lacking in both undergraduate and graduate education. As biologists, as plant biologists, as agricultural researchers, we don't see the whole picture. I work on something very specific, and I know that inside and out, and I know all the people working on it. I can say that when we write grants, when we write an NSF proposal, we always talk about our objectives, which are to feed the world, to do all these grand things. Are we really doing that? When I find that gene X has this effect, am I feeding the world? No, not really, but if I admit that I won't get any money.

**Pueppke:** But do you think about it?

**M. Hanlon:** I think we want to think about it in that grander way but it is really hard to do. When you talk to anyone here who is at a different level—from very basic research to distribution to interacting with consumers—how does one person integrate all of those levels? I don't think you can. I think they are important to be aware of, but should I be trying to figure out my role as a young scientist going forward? Should I just keep my head down and continue to do good science? And if I do well in science and I have credible findings and I gain some public credibility, then maybe people will listen to me? I think that is a question a lot of us struggle with.

**Pueppke:** Do Penn State and your department help you think through those things? I understand the nature of graduate school. Are you going to get it later after you graduate, figure out what you are going to do?

**M. Hanlon:** I think we get that if we seek it out. I come from a lab where we have these conversations on a regular basis with each other, with my advisor, with my friends, but I don't think it is something that is structured. I don't think it is something that is addressed radically in graduate education. Because I think it is hard to address it.

**Hedgecock:** I want to come back to a point that was raised earlier when we were talking about critical thinking. We need to teach critical thinking, not just a subject matter or a direct framework on how to critically think, not to be a specialist, and then get credibility instead of being seen as someone who could put things into context for the bigger picture. I would say start doing that now. You already have those conversations. It is critical for people who are passionate about their work to go ahead and do it now. It is in groups like this where we try to put things in context, where we may be an expert in one or two things and other people are experts in other areas, and we can shift things and help mold our contextual definitions. So don't wait. Start doing it now and then your network will help.

**J. Newsome, University of Arkansas:** To expand on what Molly just said, this contextual thinking is lacking in our graduate program, at least from what I have explored.

**Pueppke:** Which program are you currently in?

**J. Newsome:** Plant biology. I think it would be really nice to see more interdisciplinary connections and collaborations. I feel that it would help us as graduate students to be forced to work with others who have expertise in different niches and different areas so we don't get too specific early on when we go into a Ph.D. program and further on into our career. We are working on one particular disease or one particular organism, and I feel that is really to our own detriment as scientists, because as was mentioned earlier, we don't work in a vacuum. It is really important for us to remember all of these things that we are going to have to work with when we find our results. How are they going to fit into that larger puzzle?

**R. Huffman, Ohio State:** I grew up on a farm, and apparently I am in the minority here, but I know a lot of great scientists in ag science who didn't, and as was mentioned yesterday, it comes back to education. A lot of the people who didn't grow up in an agricultural setting don't understand the processes of grain transport, for example, and it comes down to high school, graduate, college-level education to give people that understanding of the agricultural community. People come in with no ag background, start on a specific project, and apply for grants, always putting in that really broad intro paragraph promising to increase yields, e.g., by looking at one specific protein—something that may never happen. So I feel that it is important to provide a wider educational background for young scientists to work in a framework. How and where to start are not quite clear to me.

**Shelton:** I have been coming to NABC meetings since 1993, and I always find them stimulating, and keep wishing that more people attended because it is a forum unlike most. One thing I am going to take away from this particular meeting is the discussion about values. When people have different values they came to through a long process of determination, even if they are not aware of them, those values are part of their core beliefs, and they interpret their reality based on that core. So when you talk with people, you have to understand their values.

I was recently in California, when they were soliciting signatures for putting Proposition 37, mandatory labeling of GMO-containing products, on the ballot. As I was walking around a Santa Barbara farmers' market, a man came up to me and asked me to sign the petition. I told him that this was a complicated issue, and when he asked if I didn't think we had the right to know what we are eating, I answered that it really was more complicated than that. I told him I actually worked in this area, giving him the example of a recent experiment where we grew sweet corn containing the *Bt* protein and we didn't have to spray it at all, had 100% clean ears. The kid replied, "Well don't you think people have the right to know about this, and anyway, I don't even believe your experiment." How do you explain this issue to someone in a public setting? I asked a couple more questions, and then his supervisor came over and asked if I didn't think we have the right to know. To my response that it was a more complicated issue than that, she replied that she had just read a study on the web by some French guy, and it showed that rats get tumors when they eat Roundup. I asked if she knew that that study had been retracted. She said no, but there was another study here, and finally she walked away because she was not getting far with me. I told the kid that if he was asking for people to sign a petition, he might want to first learn something about the issue from both sides. He told me: "Sir, I don't know anything about this, but my girlfriend asked me to help with the petitions. That is the only reason I am here." He had his values, I had mine, and we were both perfectly legitimate.

**Jaffe:** We talked earlier about science and the scientific method, and I want to make two comments about that: When you think about food, food is something other than science. Most of us don't eat because we have to and because that is the only way we get our sustenance. We eat for cultural reasons. We eat for social reasons. We have religious reasons. Our food choices are not scientific. They serve a lot of those other purposes, and we have to take that into account. Different food choices have different meanings;

something that you might find unappealing to eat might be what everybody wants to eat in Asia. It is cultural, and we have to remember that. What we grow and what ends up as our food might be science-based, but when people choose the food they eat they are not choosing it for a scientific reason. They take for granted that all of it is safe, and they move on to other reasons why they are choosing food.

The other thing I would say is I know that regulation is a dirty word, and we all struggled with it yesterday, but I would tell scientists that sometimes what we regulate and the oversight we have are not all science-based all the time. There are lots of other reasons why government gets involved in regulation, such as market failures or increasing consumer confidence. I know that is something that scientists don't like to hear. Regulation and regulatory decisions should only be made on scientific grounds, but that simply is not always the case. We pass laws and do regulation for lots of other public policy reasons, some of them very legitimate and some not so.

**Hedgecock:** Here are some final comments: We talked a lot about finding common ground, finding a connection with anyone about how they feel, what they think, what they know. That is a great place to start out. And rather than starting out with the ten reasons why I think it should be done my way, we need to ask questions. How do you feel? What do you know about it? Listen to the issues that might be coming from your neighbors, your friends, your colleagues, really listen. Before you speak, listen. Don't get emotional, don't get offended, never take anything personally. When there is misinformation—and people who feel a certain way will provide their top-ten list—take that as an opportunity to ask if they are aware that a listed study was retracted. Don't tell them whether you are opposed to or for that retraction. If they tell you that it was republished, ask if they are aware it was published in a paid-for, non-peer-reviewed journal? Then take the conversation to the next step, and if you don't have an answer for something, don't make it up. Tell them you see that it is an important question to them and to you and that you will check with a specialist and get back to them with an answer. Those are some of the steps I use for engagement, and I think others might use them as well. Be comfortable and confident. You don't have to know everything. Just go ahead and engage and start the conversation, because that is what is important.