After the Fact |
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TRANSCRIPT

Dan LeDuc: Welcome to "After the Fact," a podcast from The Pew Charitable Trusts that looks at the data and trends shaping our world. In our last episode, we dove—if you will—into the problems facing the oceans. They cover most of the Earth and are under threat from illegal fishing, overfishing, and climate change. Leading scientists focus on this data point: 30 percent. They recommend protecting that much of the ocean, so it can sustain and replenish itself. But how do we get to that goal? Can new technology play a role? Recently, Pew gathered a panel of experts in London to discuss how technology might actually help protect the oceans and address other environmental challenges. It was a lively session, and in today's episode you have a chance to listen in.

Rebecca Rimel: Good evening, I'm Rebecca Rimel, from The Pew Charitable Trusts, and I have the real honor and privilege of welcoming you all here. Normally, on a dreary, rainy evening, I would say we want to apologize for the weather, but I understand that would be inappropriate, given that you are desperate for rain. First of all, for all the gardeners in the room, I'm glad that we brought rainy weather for you.

This session that we have put together in this magnificent building is talking about the importance of technology and can technology save the Earth? As I was thinking about that title, given what's happened around the globe in the last three to six months, I was wondering if I should be saying, can we save ourselves from technology? But in fact, technology can be an enormous tool for the public good, and we're going to hear more about that this evening. I'm delighted that we have a panel with leading thinkers, and these are people who have committed their lives to providing data and science and technology that can be applied to helping the global environment and also to solving problems.

This is a wonderful building. I took a little tour. It's really quite special, and I understand that much British history has been made here. In fact, it has also survived history of the bombing during the blitz of World War II, so I think it is an appropriate venue for us this evening. What I didn't know, maybe you don't either, is that the epic film "Gandhi," part of it was filmed here. And so I was thinking, I wonder what Gandhi could tell us about science and technology. Not a topic, I think, we would associate top of mind, but a wise person like him with very strong

values and commitment to the public good, he did have something to tell us. "Scientific knowledge," he said, "requires constant probing into the why and what for of every little process that you perform." But he went on to say that "science without humanity was unacceptable."

Some people have called this the post-truth era or that fake facts rule. I don't believe that. I don't think anyone in this room does, but paying scrupulous attention to high-quality science, data, research, and information that can be applied to problem solving is very much at the core of the mission of The Pew Charitable Trusts. It's been that way for over 70 years, and we are fortunate that the Pew family that endowed our work was committed to doing just that.

We are changing as an organization. We are expanding, and I'm delighted that as Sally O'Brien would say, we now have a proper office here in London. And our agenda, while we've always worked internationally, we are looking to expand that agenda. We were welcomed to the Wellcome Trust today to meet with the leadership about their work and ours and interest in the problem of antibiotic resistance, which really does pose a global health threat. And we're delighted that there looks to be partnerships not only on how to steward the antibiotics we have; how to create new antibiotics and get them to market; and basically, how to have better diagnostics.

We're also pleased that the Pew Research Center is expanding their reach globally and particularly here. In the last, I believe, six months, we have three projects that focus particularly on the middle class and how it is doing in Western Europe; European public opinion about the recent influx of refugees; and factors driving the anti-establishment sentiment here in Europe. And certainly, we are feeling that very much at home in the U.S.

And we're delighted that we're building on a partnership with the U.K. as part of their Blue Belt policy. This is a program that the U.K. has really led the way. Our work is to try to create large marine protected areas, or parks in the sea, if you will, 15 of them around the globe. The U.K. really has been in the lead. The U.S. is following in your footsteps, and I'm delighted that we've had a particularly valuable partnership with the Bertarelli Foundation in setting up a very large marine protected area in Pitcairn Islands.

So we are looking to see this agenda expand, but today, we are talking particularly about our partnership with Catapult, British Satellite Applications Catapult. This is technology that would not have been possible without their leadership, their encouragement. And as one of our donors who supports this work likes to say, it's not only really cool to see, what's really special is it's helping us catch the bad guys. And there are bad guys, but I was also reminded earlier, good guys out there on the high seas. And this effort to put an end to illegal fishing has been

very successful, and I'm delighted that our panel this evening is going to talk about this at greater length.

So thanks again for being here. I think the panel has a few remarks, but then we really want to learn from you, in the audience. We have a lot of exceptional guests this evening who can shed further light on this.

It's my pleasure to introduce my colleague and friend Sue Urahn, who is our executive vice president and chief program officer at Pew. We've had a wonderful partnership over many years. I won't say how many, Sue. And she oversees all of our work, both domestic and international, the policy agenda, as well as our research agenda. So Sue, let me turn it over to you.

Sue Urahn: Thank you, Rebecca.

And good evening to everyone here at One Great George Street. We are webcasting tonight, so I also want to say hello to everyone online as well. I'm delighted to be with you all here tonight. As Rebecca said, my name is Sue Urahn. I'm the executive vice president and chief program officer at The Pew Charitable Trusts. I oversee over 50 different projects, and they provide everything from technical assistance to research to advocacy campaigns. They cover issues as diverse as biomedical and environmental research to health policy, corrections reform that we do domestically in the United States, environmental conservation, work that is done globally, and our work in our hometown of Philadelphia.

So we cover very diverse topics in very different places, but they all share a very common theme, and that is our concrete metric-driven approach to advancing the public good. So part of our approach to really finding effective ways to solve the world's most critical problems is to engage with the public in venues like this. So we are delighted to be able to hear from you tonight and talk about some of these critical issues.

So our overarching question for the conversation tonight is a small question: Can technology save the Earth? Technology has the potential to play an absolutely critical role in safeguarding the health of our planet for future generations, but we need to better understand where is technology most useful? What are some real-world examples of how technology is used to promote change? How does technology affect the development of new science? How does it affect economics? How does it affect culture? And how does it interact with policy? No small questions in any of these areas.

So we're fortunate to have four experts with us tonight to really dive into these areas. Let me briefly introduce them to you. There's more information about them all in your program, so I won't go on at length.

Let me start with Kerri-Ann Jones, my colleague at The Pew Charitable Trusts. She oversees our research and science portfolio. Previously, she served as the assistant secretary for oceans and international environmental and scientific affairs at the U.S. Department of State under the Obama administration.

Tony Juniper is well known to many of you here as the president of The Wildlife Trusts. He's also a special adviser to the Prince of Wales' International Sustainability Unit and a fellow at the University of Cambridge Institute for Sustainability.

Rear Adm. Nick Lambert is an ambassador to the Satellite Applications Catapult Blue Economy Initiative, and he is an adviser on oceans and technology.

And last, but far from least, Callum Roberts is a professor of marine conservation at the University of York; a science adviser to the BBC'S forthcoming flagship series "Blue Planet Two"; and Callum's also, I'm delighted to say, a Pew marine fellow from 2000.

So you can also participate, should you be so inclined, in the conversation on Twitter by using the hashtag #earthtech.

So let me kick it off, Tony, starting with you. You've been working at the local, national, and international levels for more than 30 years on a more sustainable society. So the question is, if you think about technology, some people think about it as a silver bullet. You develop the technology and boom, you've got a solution. Is that true? Once you have the technology is everything good?

Tony Juniper: Unfortunately, not so simple, as we all know, and technology really does have to be part of the solution when you look at the scale of what's coming towards us right now, in terms of greenhouse gases in the atmosphere; the mass extinction that's taking place; the resource depletion that we can see in things like fish stocks, water, and soil damage. All of these things are set to get much worse as the population rises and as we continue to foster economic growth.

And so technology does have to decouple the rising human demand against these environmental trends, which are becoming really quite troubling. The thing is, though, when you look at these particular areas, for example, in relation to climate change, and you look at

the clean technologies that can come there, you quickly realize that you can't simply deploy the technology on its own. And I remember very well in the debates around what to do at the international level during the time of the Kyoto Protocol and beyond, governments having a big argument about whether it was going to be technology or whether it was going to be policy, as if there was a choice.

You know, we pointed out that if you don't have the policy targets, the technology won't get scale. And if you have the policy targets without the technology, you can't meet them anyway. And so the two things have to be integrated, and you realize that it's not only about policy but also about culture, up to a point. And I spent quite a lot of time over the years working with consumer goods companies trying to reduce the environmental impact of packaging. And so they spent a lot of time trying to lightweight plastic bottles and trying to find recycled content to put in them, but if you don't have consumers willing to put that into a bin and instead, chucking it into a river, finishing up in the sea, you still haven't solved the problem. And so the cultural and political pieces of this are absolutely essential to go alongside the technology.

You've also got, up to a point, quite a limit to what technology can do on its own. And you know, quite a lot of the things that the human world needs, like fresh water, productive soils, ecosystems naturally supply those goods for the human world. And I think sometimes we fall into a trap of thinking, OK, deforestation, destruction of aquifers, the damage to soils, we're gonna invent the technology that's gonna solve these problems, when in fact, not only can we probably not do that, even if we could, it would be much more expensive than keeping the ecosystems in good health in the first place.

And then linked to that, I think, is also a danger that we become completely distracted by technological solutions and actually don't see the real problems that are before us. And I think Rebecca mentioned that antibiotics earlier are a good example in agriculture, where we've chucked the technological kitchen sink at the issue, in terms of genetically modified organisms, ever more sophisticated pesticides, machinery, antibiotics, and more and more quantities of industrial fertilizers, all of which have been predicated on a lot of technology.

And by focusing there, we've lost sight of the bigger picture, which is about the long-term resilience of agriculture really being about the health of nature, in terms of soils and pollinators. And both of those things you can see now taking on globally significant proportions, where bees in this country are disappearing, as they are in the United States. We know that soil damage has now reached about one-third of the agricultural land since the middle of the 20th century—a quite high level.

And we're missing all of that because we're putting our faith in technology, but of course, the technology remains essential. So this is not simple, but just to kind of summarize, you know, the technology is vital, but it needs to be backed by the right policies and right cultural norms. It needs to be deployed in a way where it's complementing what the natural environment does for us rather than replacing it, and we need not to be distracted from the real issues by going down the technology route. I think that would be my brief answer to that.

Sue Urahn: Which is a fabulous introduction.

So, Nick, stepping in big shoes here. So you provide a lot of information and guidance to organizations on the Blue Economy. So the economics of the oceans, the importance of data. Give us a few examples about how technology gets used in the Blue Economy.

Nick Lambert: Well, thank you very much, indeed, for having me this evening. It's a great pleasure to see so many people. And just following on from Tony's exposition there, I'm gonna look at technology the other way around in trying to understand the problems. And if you don't mind, I'll do it in the context of marine and maritime, where we know enough to be worried about the state of our seas and oceans, but we don't know how worried to be because we don't have sufficient information.

So I think we can turn technology to advantage by using it to find out what's going on, but you can't do that with just technology. You have to have willing coalitions of people. You have to have partnerships. You have to have a determination to lead and to share information. And you also need to demonstrate that technology actually can do these things. We all talk about the fact we've got mobile phones, and we've got access to space-based data, and all that stuff in our private lives. We need to prove, through demonstration, that technology can help us better understand the state of our seas and oceans or our jungles or our woodlands.

And so there are a couple of projects I could talk about. One is the illegal, unregulated, unreported fishing project, which was referred to by Rebecca just earlier, which as she said, was a great success, bringing space-based data sets together with terrestrial data sets, with historical data sets, to find out what is the state of illegal fishing and to do something about stopping the really bad guys at the top end of the game.

Now, I will say, as a mariner, not everybody out there at sea is doing illegal things. There's quite a few of us who are trying to go about our legal, daily business. And so the opposite to illegal, unregulated, and unreported fishing is legal, regulated, and reported fishing. And that means that people who are going about their rightful duty in building a business out of fishing can demonstrate that they fished in an environmentally sensitive way, that they have abided by the

regulations and therefore, they can have preferential landing rights, and then, it becomes economically viable.

Another project that the Satellite Applications Catapult is involved in is working with Malaysia. The U.K. government and the Malaysian government have come together, some funding has been put in place, and we're using space-based data with ground briefing assets, unmanned vessels, those sorts of things, to do something about understanding the states of marine pollution in the mangrove swamps in the Malacca Straits, to look at flooding on the coastline of peninsular Malaysia, and to do something about understanding the state of logging—illegal and legal logging. And this is all about bringing technological census and data sets together to enable an understanding.

And so, I'll finish in just a second. I have spent most of my naval career listening to very senior great and the good admirals wringing their hands and bemoaning the fact that we were out of sight, out of mind. Complaining about sea blindness, people didn't understand what the sea does for our global economy. That it enables our global economy and all the things that I'm sure you know now. I think we are on the cusp of sea vision. I think we will see pretty much what human beings do at sea, and we will have far better opportunities to understand what we've done to our seas and oceans.

And so what we need to do is to build partnerships. I spend a lot of time talking to shipping companies and saying please, please, please, would you give us the data? The technology is there. It's easy. We can get the data from ships, and we could share that with all the environmentalists that need it. But it's the willingness. It's the partnerships. It's the determination to do it.

And I'm not beating up on shipping companies, but quite a few people will say, well, what's in it for me? What are you going to pay me for it? Well, why do you want to be paid to help understanding? And I think that's what we've got to work at, partnerships, relationships, leadership, and sharing.

Sue Urahn: We were talking before the event started. You mentioned that one of the big challenges about technology is that it is not evenly distributed. Talk just a little bit about that.

Nick Lambert: This is William Gibson. Sir William Gibson said the future is here, it's just not evenly distributed. And I would delete future and insert technology is here, it's just not evenly distributed. And that's part of the business of demonstrating. And there are many agencies out there, Coast Guards, flag State authorities, people who have responsibility for managing seas and oceans, who spend money on limited resources, Corvettes or aircraft, or whatever they're

using to patrol, who, if we could just get them to think about using other more advanced technology and perhaps split some of their resources. They've got to understand that this technology can be used. Once they get it, you're on a roll. But you've got to press it. You've got to be persistent.

Sue Urahn: So let's stick with the marine environment for a while. Callum, let's turn to you. Your research has focused on understanding the impact of marine protected areas and the effect of large-scale fishing on marine ecosystems. Talk a little bit about some of the examples you've seen there about how technology is now affecting the ability that you have to do the work that you do.

Callum Roberts: Well, when I started out studying marine protected areas, it was in the early 1990s, and we had to look pretty hard to find any marine protected areas that had good monitoring surveillance and management. And the ones that we did find, we went on to study them. And it was just a guy or a gal in a boat, who'd go out and look at what people were doing and write it in a notebook and tick them off if they were doing the wrong kind of thing. So this was very simple technology, but it was necessary to make those protected areas rise to a different level, in terms of their effectiveness.

The question comes up again and again, how are you going to watch, effectively, protected areas? And it comes up more as more are created and the demands for resources increase. In Scotland, for example, the community of Erin Seabed Trust has set up a very small marine protected area. It only covers a couple of square kilometers, and the famous marine scientist Bill Ballantine saw it one day, and said, "Geez, you could spit across this thing."

And yet, still the Scottish government said, "Well, we don't want to create this protected area because we can't enforce it. How are we going to enforce this place?" And the response from the community of Erin Seabed Trust was, "Have you not seen how many twitching curtains there are overlooking the bay?"

The trouble is that we have to move beyond twitching curtains, and when things go over the horizon and you can't see them anymore from the shore, there isn't this kind of body of local people looking after a protected area. Then we need to start investing more in technology. And we can't be sending people out in boats to police them and buzz around those protected areas all the time. And that's where this satellite technology really comes in.

And the vessel monitoring systems, which are put on board fishing vessels are a critical, kind of low-level step, in order to watch what's going on out there and who's fishing where. And around the U.K., that's been added to vessels that are bigger than 10 meters. So the key

industrial fleet, I think, is being watched quite carefully. But there's a huge number of vessels, more by number, which are smaller than that and fishing in inshore areas. And as we've been expanding the network of protected areas around the U.K., we have to start effectively monitoring those. And that means that the technology has to be shrunk down and applied to smaller boats and the ability to monitor it remotely and to see what people are doing in real time has to be expanded.

So these things have to ping more frequently than once every couple of hours because you could be in and out of a protected area very easily and doing all sorts of damage unless there's this kind of real-time stream of data, which is being picked up and watched all the time by somebody in some office. And there's a response that they can raise if the fishermen start doing inappropriate things.

Obviously, the amount of resources that we have is limited. And I remember going into the kind of control hub of the Great Barrier Reef Marine Park, and there they were using all sorts of clever algorithms to predict where the greatest likelihood of violations was going to be. And they were going to focus resources on those places. So that you know, these are the key landing sites for people who are fishing illegally. These are the places that they're going to go where they think they can get away with doing things that are disallowed under the park regulations.

One of the things that we know now from science is that a very small fraction of the sea covered in protected areas may produce nice little local benefits, but it's not going to save the Earth and we really need to scale up. And the science is leading us toward thinking that we need several tens of percent of the oceans protected. The only way that we can do that is by applying very sophisticated remote sensing to the business of policing and monitoring those protected areas, and I think the developments now are being very encouraging.

And just as a final point, the United Nations is now considering an amendment, an implementing agreement, under the Law of the Sea to establish marine protected areas beyond national jurisdiction. The only reason that that is now possible and being considered is because there is also the possibility of effectively implementing those protected areas. Otherwise, you know, before discussions were off the table because you said, well, you've got no chance of establishing a protected area that works out there because nobody can look after it. Now, we are seeing the technologies being developed, and that's very encouraging.

Sue Urahn: It's back to what Tony was saying about that perfect intersection of policy and technology. That you can't have one without the other because it simply doesn't work.

So speaking about policy, Kerri-Ann, let's turn to you and your experience as a policymaker working on global issues. You've worked on technology in a whole host of issues. So we talked about the marine. Let's step back a little bit. Give us some examples of other places where you've seen technology make a really fundamental difference in how it's evolving.

Kerri-Ann Jones: Well, thanks, Sue. I think there's a long list of things I could talk about, but I wanted to touch on some of the other sectors that have been impacted and affected by technology. One that started quite a while ago was precision agriculture, which again made use of GPS and the ability to look at GIS, geographic information systems, to begin to use resources in a very precise way. That allows you to use the right amount of water, cut down on pesticide and fertilizers. And this technology has evolved over the years, and it's being used in many different places. And it's going to continue to evolve as we have more information.

Another one is related to forestry. I mean, we know how important a role forests play in our lives. Many, many livelihoods depend on them. They are a very important source element in the whole carbon cycle. And we know that there are many places where they are being destroyed or burned accidentally or deliberately, depending on different situations in different countries. And how do you talk about that? How do you know what's going on?

Well, again, it's an integration of space-based technology and GPS and advances in computer systems in the cloud that allowed certain groups to come together to develop Global Forest Watch, which lets you actually see in real time what's happening to different forests around the world. That's something that the World Resources Institute did with a partnership with Google and the University of Maryland and some government agencies. So this is now a real-time tool where you can see what's happening.

Another example is something quite different, which has to do with conservation and biodiversity. We know that there's a lot of pressure on biodiversity, and we know particularly for iconic species such as elephants and tigers and rhinos, they have tremendous pressure, not just because of the development that's encroaching on their habitat, but also because of poaching. Wildlife trafficking is a major international crime. It's a billion-dollar industry now, I think, tens of billions of dollars, maybe $20 billion a year. And the question is, how do you deal with this?

So one of the technologies that's being applied to that is the use of drones. So, in terms of keeping elephants away from farms or small villages, the drones are now being used to herd elephants away, and it seems to be working. And that is something that I don't think anyone would have thought of before. It's also being thought of as a way to expand coverage to see what's happening where poachers may be. Because many times, there are limited game

rangers to cover the amount of area that has to be really watched. So it's really a different use for drones than often comes to mind.

And then, one other topic, moving to the very, very tiny world at the molecular level. We've seen major revolutions in DNA technology, and now, that's being applied everywhere. So on the wildlife side, there's forensic DNA work being done to identify ivory samples, the tissues attach to it, to try to understand where that's come from. This was not done before. It was hard to track where some of these samples were coming from.

And the other piece of the DNA work can be really looked at for tracking anything. It's being used now in illegal logging. There's a term of art now that's come into play called environmental DNA, where you can go into the water and sample what's in there and sort of understand the biodiversity at the microbial level and understand how that's changing and what's affecting it.

So the tools that are out there are just constantly evolving and also crossing over different sectors. So I think there are many, many examples of different sectors where you could talk about space-based technology, the integration with GPS, and all of the molecular technologies that we now have on hand that can really begin to address some of these issues. But it is only one part of the way to address these very complicated questions.

Sue Urahn: Well, let's go back to the same theme that's been sort of emerging throughout the panel. What are some of the policy socioeconomic implications of some of those developments?

Kerri-Ann Jones: Well, you know, when I think about science and technology addressing problems, I sort of look at it in two big categories. One is one of the ones we've really been talking about, which is science and technology to provide information. What do we know about what's happening? What can we see? What can we measure to learn about a problem, as well as to see if something is being enforced and to see what changes have happened in a system? The other category is something brand new that goes out there and tries to solve the problem, like that drone herding elephants. Or to mention a topic that's becoming more and more in the world of environmental discussions, geoengineering. That's being thought about as a solution, technology coming in as a solution. And whichever category you're in, the technology immediately hits the policy world, and it hits it because it has economic implications, social implications, cultural implications, as Tony said, and all of these often add up into the political environment in which that technology is being moved forward.

From an economic perspective, the first fundamental question is who pays for all of the development of this technology? Who maintains it? Who invests in the research? And then there is the question of the displacement of technology. What does the technology do, in terms of other livelihoods? As you close off certain fishing areas, what do those fishermen and fisherwomen do? Where do they go? So there's an immediate impact in the economic side. There's also the question of socially acceptable technologies. Technology is received differently in different places and certainly, on the international world, that's something that comes into play. And the security piece comes into play as well. I remember years ago when a lot of this Earth-observing technology was coming into play, the discussion among nations about the level of resolution that would be allowed was a security issue because countries didn't want to share that kind of information. We've made tremendous progress in that, but there are also the issues of conflict.

And when I was working at the State Department, South Sudan became a new country. And one of the first groups that came in to see me because of my job was a conservation group that said the wildlife diversity in South Sudan is amazing. There are multiple migratory paths, amazing birds. We have to really help the country work on this. Well, with a country in such conflict now, that really is not something that can be a priority. They're struggling with that.

So I think when you begin to think about the policy and you step into a policymaker's office, if they're an environmental policymaker, they're going to look at your issue based on all of the other environmental issues. If they're a broader policymaker, they're going to have to look at it against things or integrate it into things such as security and health and livelihoods of their communities, and all of this comes into play. So it gets back to, I think, the theme we've been hearing. You know, technology is only one part of the way that we address all of these issues.

Sue Urahn: So Tony, let's go back to you. You sort of introduced this theme. Where do you see this intersection of policy, culture, economics, technology, playing out in interesting ways?

Tony Juniper: I think one of the things that has been said about the environmental agenda for all the years that I've been involved in it, and it remains as true today as it was 30 years ago, is the extent to which it is driven by awareness of the issues. And so if you have a population of voters and shoppers who know what's going on, then the politics becomes unlocked and people are willing to embark on new journeys towards different things.

I mean, what just happened in the United States with a president who doesn't think climate change is happening, I mean, that has closed down quite a lot of the options we have for cleaning up the energy sector, for example, and favoring coal jobs over renewables. This is pure politics, and it only seems possible to me because the voters don't understand the implications

of what's going on. And so how do we actually build that understanding amongst publics so that rational choices can be made?

And there are always going to be quite a lot of competing factors in those choices, and you know, actually one of the biggest ones right now, and I don't think we've really debated this at all in most of the Western countries, is what will be the implications for the jobs side of life as we make these choices? I mean, already in this country, the supermarkets now are populated by machines that read your shopping codes and the people have largely gone. You see coming down the track now, driverless vehicles. A whole lot of people, you know, they drive for a living, whether it's trucks or taxis. And you know, the technology is great, in terms of being able to go to these electric smart vehicles, but the pushback may not be from the point of view of actually, you know, the climate side of it, which can be quite positive. It's going to be people losing their jobs.

And I think, you know, if we don't anticipate these kinds of ramifications, then I think, probably, you know, we're not going to be able to put the right kinds of technologies next to the right kinds of policy with the right kind of public support needed to make it happen. Because people react badly sometimes if it's deemed to be a choice that's going to act against their interests. And you know, the coal miners in West Virginia, I think probably they're quite skeptical about climate change not because they haven't looked at the data or misunderstood the data. It's because their jobs are on the line and then that can be exploited by politics in bad ways.

Sue Urahn: So you mentioned reaching out to the public. There's another way that people think about technology, and that's in terms of enhancing how you do communicate about science. Your experience or anybody on the panel.

Tony Juniper: Well, I have just one small thing on that. So when I began my environmental career, there was basically quite a clear story being told about environmental issues, and one consequence of the new technology is that everybody now can make up their own story based upon the information they look at. And so this fragmentation of information sources, I think, has been one of the things we didn't see happening. And it's now, you know, it's evident in all sorts of places, where people are looking at one set of information compared to this set of information. Whereas years ago, broadly speaking, through a mass media of a few broadcasters and big newspaper titles, most people were looking at the same stuff.

Kerri-Ann Jones: If I may, I think that the communication piece is really important. And I think that the issue of discussing these issues in the context of all of the other pieces, we haven't done a great job on that. I mean, I think that's part of the challenge. You know, I think, anyone who's a scientist or an engineer, when you see some new piece of technology, you're so excited

about it. Major breakthrough, but you don't sort of say, oh, and this may cut out x number of jobs, or this may affect this community because they can no longer fish in these waters or because some other reason. And I think bringing that complete picture into discussions early on makes it a much less polarized discussion. And I think that is one of our biggest challenges. And I think, you know, we can begin to do that, but we have to also make the science and the technology discussions much more accessible and have more people understand the scientific process, that we're always getting the best data. We could get better data tomorrow. So I think this is a big part of how we make progress in the future.

Callum Roberts: So I think one of the things that's happened over the course of my career is that there's been a huge democratization of access to science. And so with the trend towards open access publication, anybody can literally log in to *Science* or *Nature* or whatever journals and look at the science themselves. The problem is that in order to understand and interpret that science, you need to have a little bit of understanding about the scientific publication's modus operandi, and you need to be able to judge good quality from bad quality. And unfortunately, as the pool that is accessible for people to read and look at has grown bigger and deeper, it's also grown very muddy, as well. And so there's a lot of kind of very underhand journals that have sprung up that are basically business models aimed at publishing junk science for profit. And there are institutes, which are dedicated to publishing science, which is not really science at all. It's agenda-driven policy positioning based around predetermined agendas.

And so I think what we have is a problem because there are many people, often prominent, you know, and in positions of influence, journalists, for example, former politicians, current politicians, who will dip into this, pick out a bit that supports their prejudices and then, you know, argue from that position as if it's from a position of great knowledge and integrity, and it isn't. And so I think there's this difficulty with increasing access to science of distinguishing good from bad.

Sue Urahn: Nick?

Nick Lambert: We're doomed. We're completely doomed. Or maybe I live in a pink and fluffy world. I think that's what it is. I think I understand all of that. I think there's another side to the coin, and that is that the big technology is the opportunity to crunch lots of data, isn't it? It's the opportunity to join up data sets, which previously you couldn't have joined up, and it's the opportunity to share that data to have better information on which to make decisions. And clearly, you're going to have some clever people who will have debates about what's true and what's not true.

But I do think that there is an opportunity to open up data sets, across governments in particular, but institutions and get that data shared in a way that people are incredibly reluctant to do. So in our private lives, people Facebook and they share data willy-nilly, don't think twice about it. In their companies and their institutions, they suddenly clam up, and they won't share data.

And there's almost a group think in there, which I find hard to understand. Rather, I can understand it, but it's going to be hard to break that. We are going to have to share data across departments, across institutions, to get a better understanding. And we've probably already gathered a lot of that data. So let's not reinvent the wheel. Let's share all of that data and then target our scarce resources and our modern technologies to find out more to build that picture. And I think that works across all environments, and I would like to move away from marine and I'm going to talk about the fact that modern technology and the ability to crunch data means that we can go across the beach. We can, instead of looking at separate domains, we can look for behavior patterns in areas where previously we couldn't have done. And there's some really exciting opportunities there.

Kerri-Ann Jones: I just wanted to add a point to that. I agree with you. I think we need to share more and more data and more and more information, but there's also another piece to that. And I think there's a perception that all technology and all information will lead to enormous commercial breakthroughs. And I see that trend as also leading some people and institutions to say, no, I don't really want to share this because perhaps I could commercialize this and make a tremendous amount of money for my company or whatever institution it is.

So there's a balancing act here because I think the message has been put out to the world that science and technology innovation is key to economic growth. And I think sometimes that's seen in conflict to science and technology needs to be open to advance the way we solve problems. And I think we just have to recognize that and have that discussion very openly all the time.

Nick Lambert: That's a really good point. You have to build in the economic opportunity. So I'm with you, Callum. I think we should be declaring marine protected areas right, left, and Chelsea, even if we are unable to monitor them. Because if you've declared them, then you can hold somebody's toes to fire, and say, look, we've declared this thing. We need to go and do something about it. And the technological pace is so quick that actually we're getting there. So that's get them declared, but also, let's think about what does that mean for building economic models around it.

Now, in my pink and fluffy world, I think that we, by bringing sensible economic models into the Blue Economy as we talked about earlier, we can actually bring regulation and governance to what is basically pretty ungoverned at the moment. So we might be able to do seabed mining in a more environmentally friendly way. We might be able to fish in a much more environmentally sustainable way because we've brought an economic model in as well. And because we know how the guy is doing his fishing, we can say to him, this is the way you do it to be environmentally sustainable. So that, I think, is an opportunity.

Sue Urahn: I think it's quite fascinating that not only this conversation, but every conversation I've been in today, starts with technology, which is fairly clean and simple and immediately branches out into the cultural, social, behavioral, political, and policy dimensions that are wrapped around that technology that will sort of be responsible for whether or not it succeeds or fails. It's amazing.

Nick Lambert: Can I just give one example. Would you mind? I mentioned unmanned surface vessels being used in this project in Malaysia. And there's a big debate running. Do we have these vessels running around as covert or overt? And people are saying, well, the local fishermen will steal them. So the alternative to that is to say to them, well, why don't we tell the local fishermen what they're there for. They are there to help us build a data set, to help your fisheries be preserved from oil pollution. And what we'd like you to do is help us protect them. And we'd like you to also get out your iPad and send us some information about what you've seen in the case of oil pollution, and let's do something about building the environment, sustain your fisheries in the future. So we've got a chance to take that policy from all the policy wonks up in top levels of government and get the local players involved in the implementation, too.

Sue Urahn: That intersection of citizen, science, and technology, a whole other sort of—

Nick Lambert: My pink and fluffy world.

Sue Urahn: Fabulous issue to explore.

So let me stop there. We're going to open it up for questions. We have microphones. Since we are webcasting, it would be great if you would make sure you have a microphone before you ask your question.

So oh, lots of questions. Awesome. We'll start right here, and then we'll move on to some of the others. And if you could introduce yourself and your affiliation, that would be great.

Tony Byrne: Thank you very much. Tony Byrne from the FT Oxford Literary Festival. I'm always struck on these occasions by the tremendous amount of decency and goodwill, vision and compassion, and all the rest of it, which like-minded groups have, and I'm greatly encouraged by the use of technology to safeguard the environment and the planet. But we are pitted against ruthless international criminal gangs and international agencies and companies, which have no scruples, in many instances. And they're also going to be using this technology. And how we marshal sufficient resources to combat their use of technology as opposed to our honorable use of technology on behalf of the good causes is the biggest nightmare of all.

Tony Juniper: Cracking question. Well, that wasn't a question, was it? That was a statement. That was a statement, and you are right. But the good thing about modern technology is that we're always connected now, aren't we? Who in here could go for a day without their mobile phone? Oh, two hands. Four hands? That's wishful thinking. So the point is, these bad guys will transmit, and so there is a very good chance of getting them. So I'm with you, but it's not all bad news.

Tony Byrne: Well, what do you do?

Tony Juniper: Well, this is why we need to demonstrate that you can create credible databases and credible data and evidence, and then you go out there and you do some legislation. The alternative is to stay in the Wild West.

Kerri-Ann Jones: I think two things. I think one is just the increasing transparency of data. There are things that we can see that we couldn't see before. But your point about so what do we do? I think that gets to this sense of an integration of policies from the national to the global level. For instance, in wildlife trafficking, as that began to be noticed as such a major international crime, source of funding for all kinds of things, countries worked together internationally. They had CITES. But then countries individually began to sort of do things to sort of try to close up their national laws and their enforcement.

It's slow because you hit this cultural issue. You hit the history of the law in that country. But it is something that comes around in the transparency and the technology to say, well, if we see this, we know where this piece of ivory is from, and then you can get to that legal system. So I think there's hope. I think it's very challenging, but I do think there is hope with the transparency.

Callum Roberts: We were talking a little bit before this presentation on camera trapping of wildlife in forests and so on. And there is a concern that poaching gangs will hack into camera

traps, and thereby find some of these very rare species and know where to go and hunt them. So that's something—maybe you can talk about that, Tony.

Tony Juniper: One small anecdote on that one, Callum, and it relates to the gentleman's point. During a trip to Costa Rica last year, in an area of forest that was being checked for ocelot and jaguar and tapir and these kinds of animals, the camera traps had taken a picture of the poachers, and the police used that for evidence to arrest them and put them away.
Sue Urahn: One for the good guys. Right here.

Peter Horn: Thank you. Peter Horn, from the Pew ending illegal fishing project, and thank you to the panel for the discussion this afternoon. You made a pretty compelling case for the link of technology and policy, particularly to this sort of audience and in this sort of country. My question is twofold. I'd like to hear the panel's thoughts on how developing countries might adopt, implement, and act on the use of technology, firstly. And secondly, how we might accelerate that process.

Tony Juniper: From what I've seen in different parts of the world, I think that the start of it is for those countries to see a political and economic case for investing in that kind of use of technology. One example I know relates to Sumatra, where there were very major peatland and forest fires repeatedly every number of years. In 2015, it got really very badly out of control. I know that has stimulated a lot of use of LIDAR technology to work out where the most important peat domes are and then to start using that information to be managing the hydrology to try to get them wet again to stop it burning.

And the interest there was a lot of people dying of air pollution. The forest fires were very bad for people's health. And also economic pressure from Singapore, which said to Indonesia, "If you don't stop doing this, there's going to be implications for companies who export to us." So I think that's probably it, really. Is that, you know, is there a case, and can the country see the case? And if there is, then the technology probably becomes something they want to use, and then you can start to find ways of developing international relations and partnerships to be able to make it happen.

But you know, there are moments when a country says, okay, you know, we are a developing country, and we do need economic development, but actually this environmental problem now has to be fixed, and campaign groups and everybody else have a role in making that case.

Kerri-Ann Jones: I was just going to add to that. I also think that I've traveled quite a bit around the world, and science is valued very differently in different countries. You know, in India, science is very important, and it has great prestige to be a scientist. And I think that more and

more international cooperation on science itself, where you learn about the objectivity of data and the importance of data, is fundamental. So there's a basic connection between countries to do international research collaboration and then building up to that, just sharing more and more data among countries. And sometimes that's difficult, depending on the political situation and the culture and the sense of power as who owns the data, and is it behind a security wall? But it's doable, and the grassroots organizations around the world, environmental and science grassroots organizations, are having, I think, more and more impact in their local political discussions, and I take that as a very good sign.

Nick Lambert: I would add, to just go back to the practical demonstration, Peter. I think we're seeing developing countries that see that this technology can be used. They didn't know it could be used. They see the opportunity, the Malaysia example I gave earlier. Suddenly, there's all sorts of agencies coming out of the woodwork and saying it can do that. Can I use it for this? And you realize—suddenly, you realize that they have all got concerns about many environmental issues, but they haven't had the ability to do anything about it. And suddenly, there's this potential solution, and they're on board with it, and then it builds the pace. But I think they need people who have done it before and know how to do it, alongside them, mentoring and guiding and so on. And it's not a short term. It's not a quick win. It's a long, persistent activity.

Sue Urahn: Okay. Other questions? Back in the middle there.

Frank Langfitt: Thank you. Frank Langfitt, with National Public Radio from the United States. One of the things you point out is that the democratization of information has actually created a lot of problems and it can be abused and manipulated by people who have agendas and people who are your opponents. Do you have strategies for dealing with this? This is an issue now also for media in the United States, in Western Europe, and also for voters in the public. I'm just curious. This is going to be with us for a while, I imagine. I'm just curious if you have thoughts.

Sue Urahn: Callum.

Callum Roberts: So I think that there is, you know, an adage in science that the truth will out in the end. The trouble is that you can delay that truth coming out a long time, and when the need for action is so urgent, then I think that that can be a very damaging thing. So I don't have as much faith in truth-slaying fear and stupidity and ignorance and so on, as I did when I started out as a scientist because I do think that the technology that we've seen being misapplied to spread misinformation, deliberately spread misinformation, is very worrying. And I don't see that there's been any effective counterattack.

You know, we're all in the middle of this right now. The whole fake news thing is everywhere, and good news is called fake news and fake news is called good news. And it's very difficult for a lot of people to judge for themselves what is quality information and what isn't, and what is fact-based and what is opinion-based. And so we're not out of the woods.

Can technology help us? I imagine that Google and Facebook are busying themselves right now to figure out ways in which technology can help, but we really need to do more. And you have to ask yourself, who's going to police this? Who's going to try and promote good over bad, and I don't know at the moment.

Kerri-Ann Jones: I think we have a task in front of us to remain very, very vigilant and active about our processes—the news is one and science is another. I think that we have to be very, very active and energized about explaining what is good science, what is good data. And we have to present that all the time objectively, even if we then have a position based on that. We have to put all the facts out there and go forward.

And I think, you know, a lot of people don't know the scientific process and how it moves forward and how you hypothesize, collect data, and keep going. And I would imagine that's similar for news articles. People don't realize good news has to have so many sources and so many balanced opinions. And so I think we have to just do that constantly. And it's about rebuilding credibility. I think it'll take a long time. It will have, you know, advantages and disadvantages from the kind of mass media quick turnaround, but I think we have to be very committed to that to turn this around.

Sue Urahn: I think we have time for one more question. That hand went up first.

Tim Unwin: Thank you so much. Tim Unwin, UNESCO chair in ICT for development.

Would the panel agree—and I have a sneaking suspicion because you've been very careful in the way you've couched your answers, I think you'd agree with the question. That actually the question we've been asked tonight is the main problem. The question is can technology save the Earth? Well, can it? Because technology is not value-free. Technology has no instrumental value of its own. Technology is used and constructed by people for particular reasons and historically, technology has been used by those in power to maintain their positions of power.

And going back to the question which I liked very much on development before, poor people in poor countries and marginalized people and those who, perhaps, care about the environment are not in positions of power, actually, to use technology for their own selves.

So are we part of the problem? We're in power. Everybody in this room is part of the elite. How do we get around that if you agree with my proposition? And thank you, once again, chair, for letting me raise that question as the last one.

Tony Juniper: I think there were two bits there, about the use of technology and also one, which I think, was posed about inequalities and including access to the kind of things we're talking about this evening. Actually, I was working on an article recently, and I began to think about, you know, what are the biggest environmental issues in the world? And I came to the conclusion that the biggest one is inequality because it causes so many things to go badly wrong, including the deployment of solutions to some of these things. In this country, which is quite an unequal country, if you want to advance an environmental idea here, very often it's attacked in the media and by different groups as being anti-poor. So you want to put up the price of energy? That's against poor people's interests and therefore, we're not going to do it. Go to Sweden, and I had a conversation with the Swedish environment minister a couple of years ago about this, and I said, "You know, how come you get so much done on these subjects in Sweden?" She said it's because we're more equal, and nobody feels as though they're a loser when we try to make progress on environmental issues. So I think the inequality piece is crucial.

Just on the other part though, about the use of the technology and the fact that, you know, my iPhone in my pocket here, you know, that can be used to organize a terrorist cell or it can be used to make my central heating more efficient and me being able to switch the heat up and down from London when I'm on my way to Cambridge. And it's like any tool. You know, you can take a hammer, and you can make a beautiful sculpture with it or you can smash a window.

And I think, you know, it's a question of how the tools are used and the motivations behind the people who want to use the tool. And we've had that before, like, you know, what you do about the bad guys and everything else. And that raises a whole lot of questions about policing, enforcement, and everything else.

Sue Urahn: So I'll let somebody have the final word here. Callum.

Callum Roberts: So I think the answer is the technology that prevents us from doing things that are in our long-term best interests is probably pernicious and bad, and we have many examples of that. I remember the great enthusiasm that there was for aquaculture to reseed depleted fish stocks. You know, you can go pour all these juvenile fish into the sea and that will solve the problem of overfishing. No, controlling fishing will solve the problem of overfishing, not, you know, just putting a sticking plaster on it.

Kerri-Ann mentioned geoengineering, you know, we can reflect more of the sun's heat back into space and carry on polluting the hell out of the atmosphere with greenhouse gas emissions and all the micropollutants there. No, no, we've got to address the problem and not use technology to avoid the problem. And I think that's something that we have to be very vigilant about in looking at the way in which we use technology in the future.

Nick Lambert: The opposite is true as well, because I don't think we can save the world without technology. So it's how do we harness it in exactly the way that you describe?

Kerri-Ann Jones: I think the answer, and I don't know the answer, but people are going to have to save the planet. And people will use technology, and I think we're in a good place now. It's still not balanced, but the openness of data and communication is reaching to many countries, where they have less resources and maybe not the same level of technology. So maybe the imbalance is changing. It still has a long way to go. But it's people.

Dan LeDuc: If you like what you heard, you can also tune in and watch: A webcast of the event is at pewtrusts.org/afterthefact. Thanks for joining us today, and we hope you'll join us for future episodes. For The Pew Charitable Trusts, I'm Dan LeDuc and this is "After the Fact."