

Women in Film and Video of Washington DC
“Meet the Science Producers” Wednesday One event, March 5th, 2014

Event Transcript

Michael: [Didn't get the beginning on audio] ...you know the level of discourse about science in our society, you know, is pretty uneven. Television, at least standard television, isn't doing as much really good science as it used to. There are lots of reasons for that, I'm sure that is something many of you may have noticed. The mission was to start this new production studio, which is what we are, to partner with outside producers and broadcasters and try to create projects on science for television. So our first series, which is about evolution, the evolution of the human body, airs on PBS starting on April 9th, it's a three-part series. It's actually opening at the Environmental Film Festival on March 18th, it's at a big theater and I think there are lots of tickets available for anyone who wants to go. And I think in some ways it was really an ideal project for us because it offered some opportunities to really delve into science in depth, but also to be really entertaining, and it's also a really multidisciplinary project that happens to have a great science communicator at its core, and that's Neil Shubin, who wrote the book on which it's based, it's called Your Inner Fish. So I'm going to show a clip of that in a minute, just to give you a flavor of what we're doing. Obviously because Howard Hughes, our parent, is so focused on life sciences, Hughes mostly funds scientists who work in life sciences. Not all medicine, all kinds of life sciences. Plants and all sorts of other stuff. So a lot of our life science, where there's biology or other forms of life science, are really core to our mission, but that's not all we're doing. We're doing Earth science as well, we're doing some space exploration and so on. Our next big project is a co-production with National Geographic Television, it's called "The Quest to Map the World." It's about cartography but it's really sort of history of science as much as anything else. And then we've got various specials that we're doing as well, one on mass extinctions, one on vaccinations and why there's resistance to vaccines, one on drug development. So it's fully collective, in terms of how we work with people, we provide both editorial expertise and funding. So we do do some production in-house, but we're mostly working with outside producers. Our output is very small, we have about 8 or 9 hours of production at the moment. But we're partnering with outside producers and distributing internationally as well. So that's probably enough about how we work, so let me show you this clip, it's the clip that's on our website that kind of introduces you to "Your Inner Fish", and I'll just mention the production company was Woodfall Films out of the UK, and the graphics are by a wonderful company called Jellyfish, also from the UK.

[clip]

Jennifer: Hi, my name is Jennifer Shoemaker. Can you hear me in the back? I work for Missions Media at National Geographic. As many of you know, National Geographic Society has a number of different groups that produce video, television for the Society. There's a National Geographic Television, which Michael used to be President of, and that's the group that actually is the in-house production company that make a lot of things for the National Geographic Channel, PBS, and a whole variety of different television outlets. I work for a different group, and the group I work with is called Missions Media. We are the folks that work directly with the scientists and explorers on a daily basis to try to get their stories and get it out to

the general public. It's not just about broadcast, a lot of times it's about web, sometimes we do live events. And I love it, because I'm a complete science junky. And I was into science long before I was into filmmaking, so it's the perfect place for me, I really enjoy it. So I brought a couple different videos to show you today, the first one I'll show you kind of just introduces you to what we do and what our scientists do. It was a film that was shown at the National Geographic Gala in the Building Museum last year when we celebrated our 125th anniversary birthday. And it was on an 80-foot tall screen, so this one's a little smaller.

[clip]

So those are the people I get to chase down the hall every single day, and ask them what they do, and go out to see... I've been really fortunate, and as you can tell I just absolutely love my job. Our group does, we kind of are a catch-all, we do just anything that comes over the transom, we capture and try do, and so we don't compete with television or anything, but sometimes we do television shows, and when we do they're always in line with a particular explorer, a particular scientist that we really want to tell their story. And maybe it's someone we couldn't get a full television crew out to film, but we create those, and we push them out to PBS or to National Geographic Television or the channel, and so the next video I'm going to tell you about, this is a project called Pristine Seas, and there's an oceanographer called Enric Sala who's basically going around the world, diving in the most remote areas, and places that people often don't even realize what an incredible wealth there is. He's kind of trying to see what a baseline would look like of a healthy ecosystem, so we can kind of measure other places against that. And so this little short video, it's a trailer for an hour-long show that aired not too long ago, it was in the Pitcairn area in the South Pacific.

[clip]

So that was just a little select from one of our hour-long shows that we did. And that by the way, the Pitcairn Islands, are where the Mutiny of the Bounty happened, so the people living there are descendants of the mutineers. He just came back from Gabon where they found an area they really liked, where they're trying to work with the government to try to create a larger marine protected area there. Then they went to Franz Josef Land with the Russian government diving in ice-cold water, and next month they're heading out to Mozambique to dive with another National Geographic explorer named Andrea Marshall, who I think she does manta rays out there. So lots of stuff we're going to be doing with them. The other thing I'll mention is that you saw, either in that or the one before, there were big cameras in balls that we dropped to the bottom of the ocean, that's another thing that Missions Media at National Geographic develops is these specialty cameras that we can drop into the deep sea. We have big sun spheres which are these huge lights that we can use to light, we do helicopters, we use them to go out and get aerials in places where it would be difficult to do otherwise. And then one other thing I want to tell you about is if you are interested in not just making films but in getting a grant to be a storyteller with National Geographic, we do have a number of grants that we offer and you're welcome to come up after to chat with me afterwards. We just made a Fulbright grant, a partnership with Fulbright in digital storytelling. We have young explorers grants, so if you want to get a grant to go make your film, please chat with me afterwards, I can tell you what those opportunities are. And the last thing I'll show you, this is very short, it's the next thing that I'm heading out to do, there's a

program called the Change the Course campaign, where you can take a free pledge, you literally text “river” to a phone number, and National Geographic and our partners including Coca Cola and Silk, we’re putting 1000 gallons of water back into the Colorado River for every pledge we get. And a part of that is that our partners in the United States and Mexico are going to do a big release of water, they’re going to open the dam, this month in Mexico, and do a release of water down the Colorado River so that the Colorado River will once again reach the sea. And it’s super exciting, we’re going to go down there and film that. It’s just temporary, it’s just to kind of see what happens, and document how the wildlife’s coming back, how the hydrology works, but this is just a very short little video about that.

[clip]

So if you guys want to find out more about that, it’s the Change the Course campaign, you can just Google it and find out more.

Wade: Well, hello everybody, hopefully you can hear me back there. I work at NASA’s Goddard Space Flight Center, and as a government federal worker, we can’t do anything without PowerPoints, so I’m going to show you a little bit of a PowerPoint, and I’m glad I don’t actually have a clip, Jen, because I don’t think I could keep up with either one of you guys, but I do have some samples of our work. I’m lucky to have worked with members of the panel, including Miles who unfortunately couldn’t be here tonight, I used to work a lot with Miles and his producer Kate Tobin. We move a little bit upstream from the final products, the glossy products and exciting products that you’re seeing tonight. I often think at Goddard that telling science stories is a little bit like a flock of birds. We don’t have as many discrete, final products as we would if we were working at the Channel or at a documentary company or at a news organization. And we often think about our challenges is in the incredible fragmentation. When I came to Goddard in the 90s, we really thought almost exclusively that it was people like Miles O’Brien and the broadcast media that were our primary customers. And we were successful if we could get something on the network news, that was a great thing. And so we had a relatively narrow focus, we put out content on NASA Television. For a little while we thought of NASA TV as like a little mini National Geographic, but then the model was, “NASA TV, it’s not for watching anymore,” it was just for feeding other folks content. So that’s the challenges we face out at NASA Goddard. We have four science themes, Earth science is probably our largest. I think there are a couple of producers here that we’ve worked with on our Earth science side, including Hal and Marilyn Weiner. But we also have heliophysics, the study of the Sun, space weather; planetary, so the next couple of years, Goddard will have one of the largest planetary programs with our partners out at the Jet Propulsion Laboratory; and then of course astrophysics, we do a lot of the weird stuff out there – high energy astrophysics, structure and evolution of the universe, the Big Bang. And so we have, for a science geek like Jen, it’s just a wonderful place. Every time you turn over a rock, there’s a science story waiting to be told, it’s crying out. And probably if you aren’t able to visualize it, it won’t be able to be heard, there’s so many of them. So that’s really our challenge, is with a very limited number of resources, how do we help you guys, the producers, and the folks on this panel, to tell those science stories.

And you guys wouldn’t be surprised to find that the roots of our science communication can be traced back to the Apollo program, really sort of the shock and awe of story-telling, big pictures,

big stories, big drama, back to the iconic pictures of the Apollo program. And then that really carried on with the way we think about story-telling as being linked to pictures, very very important things, iconic images from Hubble, Cassini, our own SDO satellite with the Sun, these are really being woven into the fabric of every-day science communication, and we're lucky to be able to share those with you. One of the challenges is in making things inherently visual. When I came out to Goddard, this was one of the pictures of the Antarctic ozone hole. A lot of people looked at this little black circle and said, "Ah! There's the hole!" But of course that was just an area where no data was recorded. And our science visualization studio, and our partners again upstream of the stories that you guys are telling, came up with ways to interpolate out the areas, to simplify the story, to make it inherently visual. And eventually, put it in motion. This is another iconic view, this is from the Landsat series of satellites over the last few decades, representing I think urban growth over the city of Las Vegas.

So again, the Visualization Studio tries to make things interesting and this is core content that you guys can use in your productions. I have a few examples of that, I think I've caused Katrina's laptop to probably almost choke. Here's an example of how visualization is actually pushing out the envelope of knowledge, a very very simple visualization of the El Niño in the Pacific Ocean there right across from the equatorial Pacific. This is from probably the late 90s, looking at the interaction between land, ocean, and atmosphere, and by getting tools to, at the time it was Dan Rathers, CBS Evening News, and the media were able to begin to visualize El Niño, be able to show what El Niño was responsible for in terms of the jet stream, even the biology along the equatorial Pacific. And I think it helped change the understanding of the interaction of land, ocean, atmosphere, and how everything works together as a system. I'm not going to go into all of these, but this is a hurricane cat scan from the TRMM satellite, taking us inside rainfall, and eventually, this gives us all sorts of insight into the Earth system, and eventually climate modeling, where I think that we were able to push the boundaries out of what people understand about the Earth system. So these were some of the samples from our Scientific Visualization Studio. This has led to I think some of the most iconic Earth science visualizations. Here's one, Perpetual Ocean, that was released a couple of years ago in concert with a planetarium show called Dynamic Earth, and I think we've heard more from people- I guess this is looking at the circulation patterns from one of our climate models, and people I think just found it very beautiful and also it increased their understanding of exactly how the ocean moves and in really much more complex ways than they might have believed before. So now the building blocks of what we do out at NASA Goddard – visualization, I've shown you a few examples of that, those are the ones and zeroes that are coming down from satellites or from space, the actual data products, and we're lucky to have a team of about ten folks who are really the heartbeat of our science.

We do make shows, we have a couple of our producers in the audience here, I think Matt and Silvia. And they actually create content that will go out on NASA Television or our YouTube channels. But really the heartbeat of what they do, is they work with our data visualizers or our animators to create that core content. And so we have another team that creates animations that provide context to our data visualizations or provide examples of things that cannot be readily visualized. And Earth science is probably about 90% visualization and 10% animation. And heliophysics is probably about 50/50, and when you get out to high-energy astrophysics, the actual images of the black holes are complex data, and it's probably about 90% animation. So

together these are our rock stars, along with our producers, but this is the core content that really is upstream of most of the stories that you guys are involved in. We do have, we're really lucky to have a great team of producers who are project managers who are working these things through. Again, Matt, who's in the back, has the Landsat program, and so if it happens on the Earth, Landsat probably saw it, and Matt is bringing those stories and sharing them with you in some of the ways that we've laid out today. So if you think about the story-telling, the way I like to visualize it is that the core content, the animation, visualization, the production, is all anchored by incredible science writing. It always comes back to writing as the backbone. And the challenge in working with fragmentation is how- the tax-payers don't want to pay for NASA documentaries, they want you guys to be making them. So we try to make that content available for as many different resolutions and as many possible different standards as we can, so that it reaches, so that it's available to many different content producers. So when we do that really well, and it's folks like Matt and Silvia and Katrina that are helping anchor these into little mini campaigns, then that content goes everywhere into all kinds of productions. And we think that when we do really, really well, we're providing the reef, and you guys come and have a very very diverse media environment. And of course everything these days, as I'm sure you guys are doing, everything's amplified and critically interwoven with social media. And does it work? Well we have ample evidence that the content not only goes into documentaries, news stories, and all the content here, but all the nooks and crannies of the media world. So that's the overview for me.

Rebecca:

[clip]

That was an abbreviated clip, and you can look at it on the web if you want to see the full five-minute clip of the preview of what's going to be shown at the Environmental Film Festival on the 23rd. The full title of our current episode is called "Extreme Realities." It's basically about climate change and national security and food security issues around the world. This little clip made it look like it's only about extreme weather events, but it's really going into deeper political and sociological issues about what we're facing around the world, particularly about political regimes and how parts of the world become unstable in response to extreme drought, food shortages, water shortages, we're already past peak oil, the world is at peak water, so it's only going to get worse, which is kind of a downer. But we do then try to find how are we going to- there's mitigation, which no one wants to talk about because everyone in this country thinks that climate change, or half of this country thinks that climate change isn't an issue. And then there's adaptation, so we look at, we really kind of try to stay away from mitigation, because of the political issues related to that and a lot of backlash, and try to talk about adaptation, how we're going to adapt to climate change and extreme weather events. I mean, what we're having here in the DC area with the polar vortex, this is related to the jet stream being modified, whether it's people saying, "Oh my god, there's snow in March, we're not having global warming." Well no, it's not global warming, it's climate change and our weather patterns are changing. So that's about the show, I just wanted to clarify that. So what we do, our series is called "Journey to Planet Earth," on PBS, and we're a little slower on how often we come on the air because we're struggling with fundraising as foundations are running out of money. So we used to do an episode every year. This episode, it took a little over two years to produce, and we're waiting for

our date on PBS, but we will be premiering, as I said, at the Environmental Film Festival which is coming up in a couple weeks. And the series, we did a lot of ocean shows, we had three shows on the oceans, so I was excited to see what you put- this one was more of a political show, so it was sort of risky, it walked the line between science – not super-hard science, sort of more of palatable science for a general audience – and sort of the sociological angle of it. That's it.

Karin: Hi, I'm Karin, can you hear me back there? I'm usually quite loud. You can't? My god. I'm the Executive Producer for ISTV, Inside Science TV, which is part of the American Institute for Physics. And really, ISTV is just a small part of AIP. What AIP really does is publish, they're a publisher of physics journals and scientific journals, that's what they make their money from, they certainly don't make any money from ISTV. We also get a little bit of cash from other scientific societies. So basically we go out and beg for money and hope that they will give us a little bit. Basically, what is ISTV, I'm going to totally change gears, I'm not like National Geographic or NASA or anything. We produce short-form news segments on science, technology, engineering, and math, who in this room hasn't heard of STEM. We're designed to fit into local TV news, there's a reason for that and I'll tell you in a minute. Basically the stories that I produce look like a TV station did it themselves. So that's the idea, it's supposed to look like they did it. ISTV has been going now for, ISTV started about two years ago, but the program itself and its predecessor DBIS has been going on for about 14 years. So it's been on-going even with budgets and all of that kind of thing. The 90-second news format, like I just said, it's what news stations want and what they can use. They only have 22 minutes in their newscast, so it's very precisely timed so you can't give them a 5-minute clip because they're not going to use it. We do eight stories a month, I do four of those a month on science. Now, thank god, we're in HD. Back in the day, me and Wade just took a tour of the Beta days, way back in the day, thank god we're past that.

They're fact checked – the reason I bring that up is that I allow the scientists to read my scripts before they go to edit because it's really important to me and to AIP that the stories are accurate. Because god forbid that something is not accurate, the scientific community will come after me like nobody's business, so it's really important to us and to AIP that we get information out to the public that is accurate about science, it's really important. We're trying to inform the public about science, we're not trying to misinform them, and that's really important to us. Trying to educate the public, we're trying to seek out the people who don't normally seek out science. We're not trying to hit the people with PhDs, we're not trying to get to the people who read Scientific American magazine. We're trying to get to the general public. The fact of the matter is that the majority, and may not be of people in this room, but the majority of people who get their news get it from local TV news and they have a high school education and that's a fact. So we're trying to get science to those people to let them know that it's a good thing, it's alright, it's not going to hurt you, it's not a bunch of crazy scientists in the lab, and if nothing else, if it inspires younger generations to become scientists, that would be fantastic. The US, we need more scientists on our team, we need more people to get advanced degrees and PhDs, whether it's physics or chemistry or biomedical engineers, it doesn't matter, we just really need to get science out in a way that people can understand it. These two clips, they're only 90 seconds so it's not going to take long. The first one is about bedbugs. I know, bedbugs affect a lot of people. I bet there's someone in this room who's been affected by bedbugs, or you know someone who's been affected by bedbugs. It's a big deal. And this scientist out at Penn State,

she's awesome, she found a really simple way- I think she's going to be a katrillionaire, because she found an awesome, easy way to combat these pests.

[clip]

The stories that I do also are supposed to be very consumer-friendly and a good consumer interest. This clearly affects tons of people, bedbugs, and this lady, this scientist, this was a great idea, and it's easy, and it works, and it's harmless to humans, so why not, and I hope she does well with it. This next video, oh, this was more of a fun piece, it kinda gets some good, a little bit of good science out to the public, and it was shot at Brigham Young University who are awesome people to work with. Have at it.

[clip]

My new favorite word is "cavitation." You put just a little bit of science out there to get to people. What else do I have to say? What do I do, I don't know if anyone really cares. But I do four of the stories per month. I schedule everything on my own, we have a small staff, it's just me and my four stories. I look up my own stories, I schedule everything, I hire the camera crews, I go on location and shoots and interviews. I've interviewed so many cool people, it's awesome. I don't have the luxury of having my own camera crew, so when I travel I have to hire my own crews. A lot of people ask me where do I get my story ideas from. 90%, and that actually might be a little low, it might actually be 95% of our stories come from press releases from universities. Me and one other girl at work, it's just the two of us, we comb through university websites constantly looking for story ideas, that's where most of it comes from and then I just go ahead to that university and shoot the story. We don't do any editing in-house, we have a production house down in Florida and they do all of the editing and graphics and voiceovers and all that. Which is nice, we don't have to deal with that. I brought the money thing up because I think a lot of people are affected by budgets. Back in the day, we used to produce 12 stories a month. We're now down to 8, just because of budgets. AIP puts in about a million dollars, which is very small for most companies I'm sure, most production companies. But they don't make any money from it, so the idea is that they're really just trying to get science out to the public, we really just want to hit a few people, and I can tell you that in my career for 14 years now, I've met some awesome people and I've done some great stories. I've interviewed some people that were struck by lightning, I interviewed a couple people who survived plane crashes. It freaked me out a little bit to get on a plane after that, because these people told me the best place to sit in a plane during a crash, and I learned all kinds of stuff and had a little bit too much information.

Audience member: Which is where?

Karin: I don't know if you want to know!

Audience member: I do!

Karin: Sit in the back. Yeah, because the plane, normally if it's going to crash, it's in take-off or landing and it splits in half, and the tail is usually the better end to be in. Just so you know. But no one likes to sit in the back! Right?

Audience member: I do now!

Karin: Yeah, now you do! I just want to say that my experience and my career and my job, I've had awesome experiences and I've been through all kinds of loud experiments and crazy stuff like that too. I did a story about chocolate for Valentine's Day not long ago. We opened the- the cacao bean comes in a pod, and we opened the pod, and I don't know if anyone's ever looked in the pod, but it's like this slimy stuff inside! And the scientist was like, "Just eat it! Just try it!" And I'm like, "Alright," and the camera guy was popping it in his mouth, and I thought it was just disgusting frankly. But my point is, I think it's just awesome that I get to experience all these cool science stories and people. And science geeks, I know they can be dorky geeks, but they're awesome, and they do great stories. And so I appreciate you coming here and listening to my science spiel. Thank you. That's all I've got.

Katrina: So thank you very much, all the panelists. Before I get into the discussion, I just want to say a little bit about why I put this together. After I graduated from my master's program- I'm very interested in science and media, and I'm from the DC area, and I started trying to look into what science media is being produced in the DC area. And as I started to look into it, I realized that there are way more organizations and much bigger, much greater variety than I ever thought. And so I wanted to showcase that for you all, how many different organizations there are producing science media. And I'm sure I missed some, I've tried to put a few more that I found on the back of the program. But yeah, you have government organizations producing science media and non-profit organizations, big large organizations like National Geographic and then you have independent producers, and then you also have all the science professional societies like the American Institute for Physics, and so much of it being produced right here in Washington DC. And so I just thought that was really fascinating and I was also hoping to maybe start, you know start a dialog between all these different parties and perhaps create a network of science producers in the region. And perhaps in the future have more events like this to cover more specific topics within science media, because there's just so much and it's all so fascinating. And with that, I'll open it up for discussion. Yes, in the back.

Audience member: How are you guys handling the issue of science and the denials? I know you, sorry I missed your name-

Michael: Michael.

Audience member: Yes, when you have, as she said, someone said 50% of the people deny climate change or evolution, and you know, that's not compatible with science. And I just wonder, do you guys have an obligation to really push back against that? Literally, someone said they're not even dealing with that issue because it's a political hot-button, but it's almost like denying a heart attack or something. I just wonder how that's affecting your day-to-day, number one, and number two, if you are really going to try to find a way to push back against that.

Michael: Well, just for my own perspective, I mean I think that's a huge problem. And I kind of obliquely referred to that when I said that the level of discourse in our country about science is kind of lacking. And frankly, it's a big motivation for what I'm doing and it's a major reason for why Howard Hughes decided to fund this effort. I mean it's a tricky thing to confront. "Your Inner Fish" is about evolution. And we're well aware that there are people who are just going to brush it off. And if you look at some of the comments on the Twitter feeds and Facebook and other places where people are commenting, there are a lot of "Yay, go team, this is great," and then there are people who are just saying the opposite. I think that one way to kind of combat it is to not shy away from it. But I think one thing that we've worked really hard to do in this series is to lay out the science process, and to really make clear how the conclusions were reached, and how strong the evidence is. When you say the word "science process" to a broadcast executive, they get all panicky, but actually science process is a really interesting thing, it's the [something] of science, and you can take that and kind of make it a mystery story. So in "Your Inner Fish," when we show it to some people, they say, "How can you possibly doubt evolution?" because we've laid out the evidence. There's also a whole branch of social science now that looks at how people get these perceived messages about science. There's this guy at Yale, Dan Kahan, who's doing really interesting work in there, others as well, it's called the Cultural Cognition Project. And one of the things that he sort of puts his finger on is that people accept or reject science in part because of how they perceive the scientist and whether they perceive that scientist as someone they would ever talk to or get along with. So if you're, forgive the stereotypes, but if you're in a community, say you're from Kentucky, or Kansas, where there's a lot of resistance to evolution. If you get a pro-evolution message from a guy in a white coat, or a guy who looks like he's a teacher of some small liberal arts college, you're just instinctively not going to listen. Whereas if you get the message from someone who seems like they come more from your community, you are going to listen. So here's just one example – we're doing a film on vaccines, which if anything is more controversial than evolution. The filmmaker has, actually she read some of the social science, and she went and looked for some of the different ways to get stuff across. So just for example, in the film, she has an interview with the Queen of England's homeopath, and you know, you would expect a homeopath to be anti-vaccine. But he looks the camera right in the lens and says, "You've got to get your kids vaccinated." So some of that is just the mix of where things come from. I'm sorry, I didn't mean to go on for too long. But you're raising a really important question. I don't know if other people have-

Katrina: Is there anyone else that wants to chime in?

Rebecca: I mean, we get- Haters gonna hate, that's how I've come to terms with it. I mean there's no debate to be had. I also do all the social media for our series, so I get all of the hateful comments, you know, "liberal," "communist," "crazy," or people try to give me their scientific evidence, "Here's why climate change is not happening," including some professors, I was shocked, I'm not going to name names, but at certain leading institutions in this country have sent me lengthy information about "This is why climate change is not happening, geologists or whatever." And I'm like, "Okay, thank you," we've gotten to the point where it's just like, "Thank you for your feedback, best of luck in your educational endeavors," you know, there's no point in debating, it's really gotten to that point, so we just say "thank you" and move on. I

mean, that's what it's come to unfortunately. As you said, Michael, there's no dialog, there's no debate.

Michael: Well I think the scientists themselves also have a role in all of this. As film people, we tend to always be looking for, it's not enough to always have the most brilliant scientist, you've got to have someone who knows how to relate to the camera, and tell his story or her story. And I think when you find those people, they could have a huge impact just by connecting with the public and explaining things well and clearly. I mean I think Neil Shubin is a great science communicator. The thing that we just did, it wouldn't be half as good without him. But scientists are a little, there's kind of a thing with scientists, sometimes they don't feel like it's their place to communicate that way. They feel like if they just issued a report or published a paper or laid out the facts, that's enough and people will get it. But I think that there's starting to be more of a realization on the part of the scientists themselves that, hey, we've got to do more than that.

Jennifer: That's what I tell, every time I work with a scientist and they say, "Oh well you're the one who's supposed to be making this exciting, you're the filmmaker." And I'm like, "Well hang on a minute, if you do this all day every day and you can't share with me why you love this, why this is so important, how on Earth am I going to tell people that?" And one thing at National Geographic, we partner with NASA actually, and we do something, I'm not crazy about the name but it's called Fame Lab. And what Fame Lab is is it's an international science communication competition. It's American Idol for scientists, with the express purpose of trying to get science communicators from all stripes, all backgrounds. We do workshops with them, and then they actually get on stage and do little mini like Ted talks, and then we have judges and everything and we pick winners, we go around the country. We just did one of those in St. Louis about two weeks ago, and the national finalists are going to be at National Geographic in April with the winner of that going to the Cheltenham Science Festival for the international championships. So that's one way we're trying to chip away at that. And it's so exciting because a lot of the people who attend these Fame Lab events are young scientists, who I think- I feel like oftentimes when you put an older scientist, I'm not trying to be ageist here, when you put some older scientists in front of the camera, they're a little bit more, you know a little less used to the idea of being up in front, and they have a bigger reputation to protect, and I feel they're a little more distrustful, maybe for some valid reasons, of what we're going to do with their science. But these young guys, they're just really enthusiastic and it's so exciting, and it's so nice to see them not just try to develop their science story but to see them try to develop themselves as someone that wants to engage with people.

Audience member: I'm wondering if, and Wade, you talked a little about this, if you all could touch on social media and digital distribution and how that plays into your initial planning strategies and outreach?

Rebecca: The series that I work on, Journey to Planet Earth, it aired well before I came onto the team. So, they were a little late to the game when it came to social media. So we've worked really really hard, and it's very hard to build an audience, to get, right when our show is fresh from broadcast week on PBS, we get a huge rush of people to get interested to like us or follow us on Facebook and Twitter, and we do all the major social media groups. But it's hard to keep

interest unless, from what I'm learning, is because we're such a small group, we don't have time to mint a lot of our own original material unless it's directly related to the show, and then we sort of eek that out. So there was a lot of re-tweeting or sharing other people's pieces that might be of interest to our audience, or particularly, I share a lot from the Guardian's environmental, the environmental reporters at the Guardian in the UK are phenomenal, and they take a really good slant. So, that doesn't generate a lot of new followers, but it does sort of keep our audience going. So it's hard, it's a full-time job for more than one person, so if you're doing that plus wearing ten other hats, it can be difficult to manage. It takes a lot of farm watering and growing, farming, fertilizing, and trying to keep build that audience. I don't know if that helps.

Audience member: I just want to know along with that, what's the pay-off if it is done well, I have yet to see it, I'm an old fart, but what has social media actually done to advance...?

Rebecca: Nothing, unless it gets more eyeballs on the TV when it comes out. I mean we do, PBS, you can watch an show on PBS.org after the fact, you know, online for free, so there's no money to be made from that. I don't know, how does Lady Gaga, who has 63 million followers on Facebook, does that translate to 63 million dollars, I mean people buying her album, I don't know, people just like to follow her. They keep on saying some day the money will come, it hasn't helped us yet, but you know, we don't know how to monetize it as a small, independent production company. But it does help our numbers for when we're on broadcast week, PBS premiere week rather, we can use that to go to foundations for funding and say, "Hey, we were the highest rated news show our week on PBS, blah blah blah." But as far as direct [monetary benefit] – no, if anyone figures it out, please tell me, because we haven't figured it out yet.

Michael: But I think there's a pay-off in a longer lifespan for the film, if it's a film. I mean when I started, a long time ago, you made a film, it aired, that was that, it might get some repeat. Now, networks like the Smithsonian channel have had huge success, not on every film but on some films where they might not get such a big audience initially, but they'll get, they'll stream it and they'll get a million people watching it. That is not insignificant at all. And I think websites, depending on what kind of websites you build, those can also have a life afterwards. So for example, for "Inner Fish" we have a program website, it's pbs.org/innerfish if you want to check it out, and there are videos and so on. One thing that's there that I think is sort of cool is we've built this 3D body, and you can click on different, you can rotate it and click on different parts of it, and it will give you the evolutionary history of that body part, like where did your hand come from. So that's on the PBS network website, but it's also going to go on the PBS Learning Media so that the teachers can use it. And we have this big science education program and it's going on our website, our interactive for teachers to use it. So I mean I think that's a whole other world that we haven't really touched on which is science media for the classroom. The things that we're doing are designed to spin off short films that go to teachers and that sort of thing. I've started, at a certain point I've started thinking of these things of, even if you're making a film or a series, you have to think of the film or series as just sort of the middle of the circle, and there are lots of things around it that are going to get to people who are maybe, like my kids don't really watch TV but they watch it in their own way, you get different demographics and age groups, you know, and it will sort of extend the life of your project. But that said, it is a lot of work to do it.

Rebecca: Yeah. Yeah. And I'm sorry, you're right, life after the airing, as you said, it used to be that's it, one shot. And we do have some educational materials, and teachers do use parts of our series, so it does have some life after that. And also STEM people know that it's not passive learning, that everyone's trying to get away from that, it's what you do to get the students' butt out of that seat and something learning actively. So those are challenges and there are ways that social media and web can live on and we do have teachers' guides with suggested exercises and whatnot that are outside of eyeball learning, actually being physically involved. And we have some leverage through the web and social media to help get that out to teachers.

Michael: Plus promotion, you know, if you can get, I forget her name, but she has a very familiar website. Do you all follow "I Fucking Love Science"?

Everyone: Yeah.

Michael: Which was a very small website until she added the second word. I mean if you can get her to tweet about your movie, or your website or whatever, I mean that's huge, that's a Superbowl ad.

Wade: Can I just make one comment in addition to that is, everybody knows it's important in social media. It's one of my pet peeves when we talk to the schools that are training the next generation of producers whether it's the AU or the Montana State program, is I don't feel that they emphasize enough the idea of the campaign, and how one supports the other. We still have a news room, but it's a vestigial artifact compared to the team, the little nucleus who hangs out with the producers, who hang out with the web team, who are amplifying everything, they're much more nimble than the old news room. And I think that these days, people are exploring all kinds of different nooks and crannies, whether it be the 15-second version, I mean literally a 15-second version of a visualization that goes out through Instagram, in a format of something like a "Now this" format that you're starting to see. And obviously just tweeting out the essential images. I think it's one of the, it's really eclipsed our traditional ways of sharing and storytelling.

Audience member: I hardly ever even know where to start. This has got me so excited. As Wade was talking there, I was wondering, do you still think there's a place for a more traditional type of science story telling in this media environment that we're in now? I mean, is one feeding the other, or is one replacing the other?

Rebecca: What do you mean by-?

Audience member: Well I mean I grew up watching "The Ascent of Man", and you know "Cosmos", the original "Cosmos", and James Berke, "Connections", things like that. I'm still a devotee of "NOVA", every time I can get in front of the TV at 9:00 on Wednesdays I'm watching "NOVA". So those are the more traditional kinds of, you know, science media. But I also love the kinds of things that Wade puts out. And I'll sit and browse the NASA TV all the time on the web, and I don't know how we wasted time on TV before YouTube. I'm just wondering, are more people now going to be starting to do that, or are we still going to be able to see the wonderful, the more traditional kind of documentary things?

Michael: Well I think, I'm sorry, were you-

Rebecca: No, I'm sorry, I mean obviously it's shrinking, traditional outlets, but there are exciting new ways to see this, as Michael pointed out. I think we just have to change our- I still can't watch anything on a tablet. I can't, you know, I like to see things big. It's still hard, but one day I'll probably get there, that's where I'm going to have to catch up on stuff rather than television or theatre.

Jennifer: One thing, our little clip I showed from the ocean shows, I feel that's a very traditional science documentary. And a lot of those that we do, we'll actually go out and we'll put the money forth ourselves as Missions Media without an outlet, without distribution, because we can do that because we're National Geographic, to go out there and get a story. And 9 times out of 10, hey we created an hour-long film out of it. I don't think we could have sold that beforehand and got someone to buy on a lot of these to go out. We end up making something and then we kind of give it to them at a deep discount and say, "Hey, can you put this on," and it sort of, what we get out of it is we get our scientists on a big television show. And, but they rate very well, surprisingly well, and because we cover so much of the cost, a fraction of the cost. So we give out a lot of stuff for a very low amount of money that people love, but it's because it's very cheap. If we had quoted them the real price of it, I think they would have said no, or if we would have asked up front, I think they would have said no.

Michael: I mean some of the shows you refer to are absolute classics, and those are the hardest things to do just because of the price. And also they're complicated and hard to pull off. I think we're kind of having a moment right now because of "Cosmos", which is 13 hours, incredibly ambitious, on Fox of all places, being promoted like crazy. And what we're doing is designed to sort of, you know we're not doing anything that big, but we're trying to sort of play in that sandbox. "Your Inner Fish" is a very expensive series and it's being very heavily promoted, and although it uses humor and it's got some funky stuff in there, it's pretty traditional really in that sense. I think it's going to be really interesting to see how "Cosmos" does, because- and I hope it does incredibly well. And I think anyone who cares about science on TV should really be pulling for it because, you know if they can get the Fox audience, I mean they're trying to get beyond that audience but if they can get that to work on Fox for 13 weeks, that's huge. And maybe that will encourage some of the other networks, because one of the things that's happening- I mean, there are really two reasons why there is less good science on TV. One is money, because budgets have shrunk, but the other is that a lot of the, I'm not going to name names but you probably all know who I'm referring to, many of the sort of knowledge networks have really stopped doing serious science, they just don't do it. And that's also part of the background of why we've tried to get into the game. But I think every time something sort of goes well, whether it's "Cosmos" or "NOVA" or anything else, that's a sign that people want this stuff. So I'm optimistic, but we'll see.

Audience member: You all sort of touched on it a little bit. I'm a producer with Fairfax County Schools, and so I was interested when you all mentioned the K-12 education and getting to teachers and students in the classroom. This sort of ties into the distribution talk that has been going on. We're in the process of with satellite broadcast, and then we're also on YouTube, and

Vimeo, and iTunes U... Do you all have a favorite way to get to teachers and to get into the classrooms, and to get the message incorporated into curriculum?

Rebecca: I mean we do, as I said we do distribute our series to educators, actually we have a closed network, it's not to the public, to see the full shows, and primarily that is to be part of our fundraising scheme. Without selling the educational rights to our series, we couldn't survive on foundation grants because they're, those budgets for independent producers going out to foundations is next to nil. So we do distribute our series, we have some things that are free on the web that teachers do use. Our educator guides are free, we have lesson plans that are free, but the actual film content, we do license to educational institutions, college, all the way down to- we cut ours off at 6th grade, and then public libraries. So we have about 3000 institutions in the US and Canada that use this series. And again, that's an important part of our business model because we just wouldn't have enough money from foundations without also doing the educational rights.

Michael: If you go to, there's a website called Bio Interactive, I don't know if you've heard of it, it's part of the Howard Hughes science education program. If you go there, you'll find a page on "Your Inner Fish", and you'll find all sorts of resources. Because this other group is sort of a sister group to mine, they produce short films for the classroom specifically with curriculums and stuff like that. But on the Inner Fish page, you can get short videos that are related, you can get curriculum and classroom activities, you can get this interactive, plus there are probably at least six films. Three short films that relate to "Your Inner Fish", and other short films that relate to evolution. So there's a lot of resources there. And you can also sign up for educators, educators can sign up to get a 50% discount on the DVDs of the whole series. We're unusual. I mean I know that National Geographic has a whole educational division, so does PBS with PBS Learning Media, so there are a lot of folks working on this and trying to make these things resonate with teachers.

Jennifer: I feel like I can't really answer your, as an outside entity on how to get it to an educational venue, but with National Geographic of course we do a lot of, all of our big shows we have an educational campaign, we have teachers' guides, I just did a sizzle, an "Engineers in the Classroom" video. For basically if an engineer wants to talk to kids, they take this little sizzle video and when they walk in to a room with a group of kids and they freeze up and they don't know what to say next, they can pop the video in and it gets kids jazzed. So then they can go in there and talk. So we do all that and big packaging around all this stuff, and it's DVDs and online, and we throw everything up on YouTube too. And I know for instance in informal education, we have an NG Live public program that we do cut-downs of and actually put on the web, and we put them to Hulu, we put them to iTunes U, and we put them to YouTube, and YouTube just blows everything away. Hulu and iTunes U are a very small proportion. But we still do it because we want to get out there to people. And there's also FOR A.tv which is another one we put out to, which is like a little TED-style internet site. So that's our informal education.

Katrina: I believe there's a question back here somewhere? Yes?

Audience member: I was wondering, do any of you find of value the social media for discovering resources on who's doing what in different areas. My [optomologist?] said, "Oh, I'd really like to Google Glass, and I want to do [uber?] surgery, which is to say use cutting-edge technology to improve the quality of the patient-doctor relationship. And a major source I have is going to the web, and it's less than perfect perhaps, but at least you discover who is doing what, and you can communicate with them to say, "How'd you do that?" or "Have others you're associated with are doing something similar to that?" Otherwise, I don't have the time to pour through a whole bunch of scientific journals, and if it's a journal, it's history.

Katrina: So is the question, do we use social media-

Audience member: The question is, are we using social media in order to discover resources and develop content?

Rebecca: We definitely use it as a research tool, and also from the filmmaking point of view, not the science point of view, how not to replicate what somebody else has already done. Particularly if it's a recent film or series, so we use it for both ways, "don't do this" and also as a research tool.

Katrina: Yes, over there, yes?

Audience member: Hi, I'm Adrienne [something], I work with [something] Communications, we do a bunch of different science projects. And mine's sort of bringing in the science and the producing, because I've always found science is, we're learning, we're teaching, we're explaining something, and this might be more for Jennifer or Michael is that – Are you finding that equipment, the camera equipment in order to capture science, on almost every video there was a high-speed camera or [something] cameras, and for me personally we just did a series for the Smithsonian for their digitization program, that they're 3D scanning objects in the museums. So we had these great 3D renders that we were allowed to use in our videos, and just a few years ago there were just tapes on my desk, and now we're doing 3D renders and big cameras and lights and drones, and do we really think that we're moving, is camera technology moving at the same pace as the technology of science? And learning science seems to be moving more than our camera technology and I just wanted to get your guys' thoughts on that.

Jennifer: Okay, I'm not sure I fully understood the question you're asking, but I'll- do you want to phrase that one more time?

Audience member: Just that science is so progressive and we're learning so many new things, and how do our, is our camera equipment keeping up with being able to tell the story? Like with for example the bubbles with the high-speed camera. If we didn't have that high-speed camera, that would not have been learned, that would not have been something that was taught.

Jennifer: Yeah! So high-speed photography is absolutely fantastic, right, we did this big thing, we had a very short clip on it where we actually filmed a cheetah, right, that was a big project that we did in the last year, and yeah, we probably couldn't have done that even just a few years ago with the technology we had. So it's really allowing not only filmmakers to tell better science

stories but it's allowing scientists to better understand a lot of the processes that they're studying. On the flip side of that, I would say when we give grants to new scientists now and we send them out in the field, we actually had a conversation on this this morning because we used to give them small cameras to go out with the idea that they're not going to come back with the best stuff of all but they might get something really juicy that we might be able to slot into a show. We were saying today that oh my gosh, they're getting better stuff with the camera [holds smart phone up] that they already have. And so, we have a new web series that we're just starting to do called Explorer Moments, with the stuff that people are grabbing with their iPhones in the field, we just tell them "Don't hold it vertical," which is the big thing, right. But this, them going down a river with this [holds up smart phone] or their little GoPro, which 99% of people who are doing any sort of expedition and exploration science have, that's just fantastic. And if the content's good, I don't think it really matters so much what it was shot on. I think this is what's making the next generation really good filmmakers is because they're trying stuff out without getting caught up in the really high technology stuff.

Rebecca: Can I say something about the flip side of that, is in another way it's forced obsolescence. I don't know if you're on iPhone 10 or whatever, and just two years ago you had an iPhone 1, but there's the flip side of that where with broadcast standards, now this is obviously not for web but for going on TV, we have a lot of footage that the only people in the world who caught them were in third-world nations with their cell phone cameras which are not HD, they're not you know whatever, but no one else has this footage, there wasn't even a NatGeo or BBC reporter at the floods in Pakistan in 2010. That footage isn't meeting US broadcast standards, and it becomes extremely expensive to try to make it meet those HD, so while it's wonderful and it's mind-blowing, it's also affecting, you know everyone said the democratization of filmmaking and filmmakers, and people around the world being able to tell the story if you have a cell phone camera like she said or you have all the equipment. So we're trying to use footage that's even only two, three, four years old, and it's unacceptable to US broadcast standards. And so that puts a huge financial strain on independent producers, and so personally, I just say "somebody please take your foot off the gas with our evolving technology," because it's really making it hard for the little guy to keep up, or for people somewhere weird to document something that nobody else has, and then to have somebody say, "Sorry, that doesn't meet our standards, so it will cost this in order for you to broadcast it in the US or Europe." So that's just a thought on the flip side.

Karin: I want to add also that, I probably have the lowest camera guy budget in this room, and I don't get fancy equipment at all from anyone, in fact I have to beg for half the things that I want. I had a guy that wanted 50 dollars extra for a wireless mike, it was crazy, so...

Audience member: [Someone's] having their big annual yard sale soon.

Karin: Excellent!

Audience member: Seriously, go there!

Karin: So I think that so much of what I get is from the scientists themselves. These guys have a lot of great equipment, they can make these 3D animated models, awesome cool stuff. They

have grad students that are free labor that can do everything! Are you kidding me, you can get so much good stuff just from them. Every time I talk to a scientist on the phone just to see if the story is going to work out, “Hey, what visually do you have?” “Oh, I’ve got these awesome 3D images that blah blah blah, cells and moving and all this kind of stuff.” And they’re fantastic! And all I had to do was show up and shoot it on the screen or take it on my thumb drive and go. So I think there’s absolutely a possibility that you don’t have to- just like the GoPro and a little iPod, you don’t have to have all that fancy stuff.

Katrina: Okay. I would like to end with one last question. I’m curious to know why you got into science media, if this was something you wanted to do from the very beginning or if you just stumbled upon it and liked it and stuck with it. Karin, would you like to share?

Karin: Oh, really?

Katrina: Yeah.

Karin: I really stumbled into it. I’m probably the only one! I was in college and I was working at the American Institute for Physics and, the true story, there was a producer at the time, the guy had to do, I hope he’s not here, he had to do one story a month, and I don’t know the details but he couldn’t do it and he got fired. And I walked into my boss’s office, I had been working there, I graduated maybe three months before then, and I walked into her office and, luckily she liked me, and I said, “Hey, I bet you I can do his job.” And I said, you know, I’ve been reading all this stuff that comes across my desk for the past six years I’ve been working here, I can write about science, give me a chance at it. She let me do one a month and it just progressed from there. I will tell you that, for a 90-second piece, I was like, “Oh, I can write 90 seconds!” Are you kidding me, it’s so hard to take so much science and make it really simple in 90 seconds. I don’t have an hour, I don’t have 30 minutes, 90 seconds is actually very challenging. And there’s so much that I have to sadly leave out, because it simply won’t fit and it is hard. But I do love science and I took lots of science classes, I just want to say that, it’s awesome and I love it and I love promoting it.

Katrina: Would anybody else like to share?

Michael: I mean I love doing films on science but I love doing films on other things too. So, you know, I did not set out to do science. I mean I love what I’m doing now, I think it’s great, but you know, I hope I get around to doing films about other topics before I’m forced into retirement.

Jennifer: I’ll share mine really quickly.

Katrina: Sure! Yeah.

Jennifer: When I was just a little kid, and I lived in the ‘hood in Los Angeles, and I remember, it wasn’t right when Mt. St. Helens erupted, but it was a year or two after Mt. St. Helens erupted, I saw a documentary on television and I was like, “What! That’s crazy, there’s a volcano going off, and it’s blowing out sideways, what’s going on!” And I was like, “Dad! We have to go

there! We have to see that!” And he was like, “I can’t take you to Washington state to see Mt. St. Helens.” So then he took me to the library. But anyway, I remember, my experience of that was I thought, “My gosh, I really want to learn about this.” I knew I loved science I think from even before then, but then I remember thinking, I was like, “Thank goodness someone went and filmed that and then shared it with me, because I can’t go out and see it but at least they brought it back to me.” And so then ever since that time, that’s what I really like to do is to just go parachute in, hear what everybody’s doing, and then go back and share it with everyone else. So it’s a dream come true for me.

Katrina: Great, so can we have one more round of applause for all of the panelists! Thank you very much everybody for coming out! Have a good night.