2015 Global Case Competition Reveal

GERMAN ROSE: My name is German rose and it's my privilege to serve you as the acting Vice Provost for the Office of International Programs. And to welcome you to the fifth annual Global Case Competition revealing. This is where you'll find out what you'll be working on for the next several weeks and preparing for the competition.

This is a unique event at WSU in that it calls together virtually the entire university. And I'm going to read to you just a few statistics about who you are as a group. This is a fantastic event that unites us. We have undergraduate students and graduate students. There are 120 students participating in the first round of the Global Case competition this year. 85 undergraduates and 35 graduate students. We have a graduate student, at least one on every one of the teams. We have representatives from all of the campuses of WSU, Spokane, Tri Cities, Vancouver, and of course, Pullman.

And by the way, the global campus this year has contributed 24 participants in the program. And all of these numbers are records by the way. We're setting new records every year with this fantastic event.

We have international students participating as is only appropriate for a Global Case competition. We have 25 international students, and every team will have at least one international student on it.

So you're to be congratulated for taking on something that is unique. Something that you probably haven't had an opportunity to do before in your time here at WSU, or probably at other schools, if you're a graduate student and you came here from somewhere else.

So thank you, very much for your participation. And congratulations because this is a fantastic event. And we're going to find out in just a few minutes what your challenge is.

So having said that, I'd like to turn this over to Dr. Christine Oakley who's going to set up the rest of the revealing.

CHRISTINE OAKLEY: Hi, I'm the person who has emailed all of you and let you know that you're going to be participating in this year's Global Case. So welcome. And as German said, this is a record year for the Global Case. It began in 2011, and progressively throughout the four years, this is the fifth year, it has increased. And we had to cap it at 120 students, because our judges can't read any more than 20 solutions for you.

I want to know-- German read all that statistics-- so how many of you-- so that you can raise your hand-- how many of you are team captains? And for which teams? So that everybody knows who to gravitate to when they want to talk to their team captain-- 16, 15, 7, 10, 2, 6, 9, 20. Yea. So if you're on one of those teams, find your captain. And how many of you are student

participants? Not everybody here is a student participant, raise your hands. All right, thank you. This is a class.

And how many of you are faculty advisors? For which teams? 8, So some and 13. Would you like a seat? OK.

And some of your faculty advisors are on other campuses and so we have representation of faculty and students on all campuses. How many of you are judges? We have one of seven judges here. And our judges represent WSU people who work in plastic and waste management. We have folks from industry. We have community based folks. And we have people who are experts on Brazil.

So it kind of cuts across all the expertise that is needed for you to evaluate your cases.

Today Dr. Carl England is going to provide you with a little bit of background on the case. He is a research professor with WSUs Composite, Material, and Engineering Center. Do you all know where that is? No. It's not here directly on the Pullman campus. It's over on Terraview at the research park.

So I'm going to let-- I know you're all here to hear Carl, and not me-- so I'm going to let Karl tell you a little bit about global plastic waste.

CARL ENGLAND: Hey, it's like Christine said there. I'm Carl England. I work at the composite lab. And I'll show you a little bit more about that. We're over by Schweitzer. We're still a part of campus, we're just kind of off campus a little bit there. And I'm going to talk to you about something near and dear to my heart. If I can open it. Oh, OK. I can see it there. There you go. All right, you guys see that all right?

Recycling plastics-- god, where do I even begin? Some might love to work with something that's passionate to my-- it's a great thing that I work in here at WCU because I can take some of the passion that I have and actually do research on. That. And so it's a really fortunate thing that I have here at WCU.

So let's talk about the big question. Why do we throw things away? And I don't ever buy plastic bottles, but I figured since I was talking about recycling plastics I need a prop in my hands. So I bought one here.

So why do we throw stuff away? It's normally the end of it's life, it's broken. It needs to be tossed. It's served its purpose. I'm done with that bottle. Doesn't do anything more for me, so I throw it away. It doesn't have any value. If something has value you're not going to throw it away, are you? If you can get money for that you're not going to throw it away.

So what else are you going to do with it? Is it just going to sit in your house and clutter it up? No, it's a convenience. Our garbage system and our disposal system is just a convenience. You

can throw trash away anywhere. I mean some places you got to pay to go to the restroom, and you can throw trash in almost anything. So it's very, very convenient.

In our society, and our lifestyle has been steamrolled into this materialism, buying stuff, selling stuff, and buying more stuff philosophy. And I'm not here to preach about commercialism, or materialism, or anything like that. But we do have this lifestyle that we're all used to.

And the plastics industry really started to accelerate this disposable society, that we just kind of-- we make something, a plastic bottle, a milk jug, you name it. We throw it away. And that's what happens to it.

So what we'd really like to be able to do is actually start recycling these materials. And there's recycling going on. And there's a lot of efforts that are going towards this. But there's something we've got to really kind of take a look at, and that's our terminology.

If I take this plastic bottle and I go throw it in the blue bins or whatever bin that says plastic bottle recycling, this is PET. Have I recycled at that point in time? No, I have diverted it. I took a very big step into this turning into something else. But I've really only diverted that thing. And I put it into something that somebody else can take and then turn it into something else. And that's what recycling is. Is it adapts to a new use.

So if I take this plastic bottle, I put it in the bin, somebody picks it up from the bin. They grind it up, they do whatever they want to, and it makes a fleece out of it, I recycled.

There's a different variety of recycling terminology that you need to get yourself familiar with, reuse. I take that same plastic bottle and I pour water in it, it's served its purpose again, hasn't it? And so I've reused that. The same thing with our cups and plates at home. We don't throw our plates away every time. We reuse them. So plastic and a variety of materials can be reused.

Downcycling is another term for some aspects of recycling, where this-- if I recycle it-- turns into a lower value product. So if I take this, this is glass. And I take glass and the glass recycling around here goes into a grinder sometimes. And it's used for road packing or under for a low value fill in ditches, and that kind of stuff. So that's kind of a down cycle.

If you take this plastic bottle and you grind it up and use it for incineration, for energy, that's kind of a downcycling aspect of it. Upcycling is if I take that same example and turn into a jacket, or a cell phone, or computer part, or something like that.

And then there's refurbish. And we've been doing refurbishing for a long time. We take a motor, you refurbish the motor. You take a computer, you refurbish it. These are all different ways of recycling.

We can recycle them into art, which I think is pretty cool. Lot's of different structures you can do, you can make. You can do it into an art with some sense of functionality to it, where you get

little planters going there. I thought this one was really quite interesting. This is a roof system that was made of a bunch of smashed bottles.

I like to do this at my house. I like to just find old recycled stuff, or old stuff that's in a-- Wasankari. Ever been to Wasankari over in Moscow? It's a little demo site over there. And they got just tons of really cool stuff. Pick through that and make whatever you want to.

What's one of the problems with this? Does it consume a lot? You make an art out of it-- kind of like that, you might use 200 bottles. You're not consuming a lot. I mean, WUs campus could supply the artwork probably, for most of the nation.

What we really want to start going-- is turning this stuff into something functional. So this is Ford's actually doing this with carpet. So the carpet, this is probably a PET, but a lot of carpets are nylon which is a really expensive polymer. You're taking out nylon harvesting off and then injection molding it into a car part. So that's very functional. We sell a lot of car parts. We can do a lot of things with that.

One of the things that I do quite a bit of work on is composite decking. You've seen the Trex decking, those kind of things. That was started about 20, 25 years ago, and the main onset of that was using plastic film, recycled plastic film. They consume a lot of plastics, a lot of recycled plastics in that.

So we're doing pretty good but we still got a long ways to go. As I mentioned, the 60s is basically when plastics are really starting to come online, started the revolution of polymer industry. And as you can see, it has climbed to almost 32 million tons per year. And this is just in the US alone. And you can see where our recovery, it's a bit dismal, down here about three to four tons per year-- or a million tons per year.

You can see up here in this graph-- if you can see it-- these two are actually some of the high points of plastic recycling. That's your milk jugs, and that's your PET bottles. So we're starting to get about 30% recovery on there. But that still means 70% of it is just going out, going into landfills right now.

So some of the really big hurdles you guys are going to start to find when you start working on this case is, of course, when doing anything manufacturing, making a new product, or anything, it comes down to economics. The cost has got to be there for it. Your business costs, business related costs, the cost of virgin plastics.

So plastics, as you know, come from-- anybody? Oil, and natural gas, that's where you usually get synthetic plastics from. So making sure that you don't get too high above that. And normally recycled plastic costs are actually quite a bit lower than virgin costs right now.

The secondary manufacturing, when you process it into something else, some of the issues that you might have of that. Logistics-- just the shipping of like Styrofoam peanuts, it's just a bunch

of air that you're shipping a lot of times. Same thing with bottles and plastics. Other plastics is-- just shipping that lightweight material all around, separating it, getting the PET from the nylon, from the polypropylene, from the polyethylene. All of these different polymer types that get mixed together is a big issue. Cleaning, as you can imagine, there's a lot of stuff that needs to be cleaned before you can do anything with it.

And then also the carbon balance. Did I just put more energy into recycling this thing, and cleaning it, and separating it, and transporting it into something? That I could very easily have used just the oil to do all that to make a plastic as it is again. I don't like to look at it that way. I like to look at it as we're actually removing it from the landfills also. But all these things are very, very daunting. But it also makes it fun. Because if it was really easy, everybody would be doing it. And we wouldn't be here discussing it. So that's what makes it fun. That's what makes a good research project.

Because if we don't do anything this is what things look. I don't know if you guys have seen The Synthetic Sea, Captain Morgan. I kid you not, Captain Morgan did a talk over at UI a couple of years ago on The Synthetic Sea. And there is-- all of our seas have-- he explained it kind of like a toilet bowl that never flushes. The way the currents run and they just collect all these plastic islands throughout the oceans. And they can be pretty bad. A lot of them are really fine and they get into the fish gills and all that kind of stuff. And so it's just a bad thing.

I'm not here to say anything bad about plastics. I work with plastic. I think there are very good materials. But they all have a place. And we have to respect them. And we have to take care of them. The one thing about plastics that's really bad is that they persist. They stay out there. They found helmets for World War II in the ocean, still floating around. The really good things about plastics is they persist and they last. Cause they're good for outdoor exposure, outdoor environments. That's why decking lumber is made out of these things.

So what is WU doing to help right now? So as Christine mentioned, I work out at the composite materials and Engineering Center where we do a lot of processing of composites. So like this table is particle board, probably, underneath. We do a lot of work on particle board, and laminates, and orient strand board, plywood. Those kind of things.

We also do a lot of work, as I mentioned, with wood plastic composites or composite decking. One of the things that I've been really getting into lately is dealing with recycled streams. And one of them, I'm actually going to be running this tomorrow. We take work with the material in a recycling facility in Tacoma, Washington that sends me this fiber. They kind of shear off the fibers off the carpet there. I turn them into pellets and then I make a little post for them. And so those are the things that we do.

We're looking at carbon fiber composites and recycling those. We look at a whole host of wood waste streams and recycling those. And a whole host of other types of plastic, skis, ski boots, plastic waste streams off of paper mills. So there's a lot of things that we do out there.

Another thing that's come on here just in the last year is the Center for Bioplastics and Biocomposites, which is led up by both Iowa State University and WCU. And Dr. Kessler here in the mechanical engineering department is leading up our side. And it's a National Science Foundation industry university co-operative research center that looks at biocomposites and biopolymers.

You know, like I said, synthetic polymers come from oil and natural gas. Well it's also feasible and very feasible to make plastics from bio-based materials, renewable materials. So you can take corn turn it into ethanol, turn into ethylene, and turn into polyethylene. And a variety of other types of plastics that you can make polylactic acid, same kind of process.

So this is a center that looks into these types of materials, and making these, and the hurdles, and the potential that these things invoke. And one of the big things they have is that they're biodegradable. So you can take a PLA bottle, or a variety of these other bottles, and put it into the compost and it will actually break down. But they can also make these things be durable just like regular synthetic polymer. So there's a lot of advantages. A lot of cool things going on in that area.

So you know where we sit in these kind of talks, you go, wow, that's really cool. What the heck can I do? What can I do? And you guys are doing a really cool thing this global case competition. I didn't know about it because I am all the way over on the other side of campus. So I don't get out much. And when I heard about it I said, this is great. This is great. So you guys are doing a really good thing. You're getting involved. You're problem solving. That's a great thing to do.

Do it at home. Do it in your local community. Do it in your workplace. Getting people to recycle, just doing it by example, is a huge thing. Consume less and recycle more. I know everybody hates that. When you get right down to it, that's the crux of a lot of problems. There's no reason to buy a bottle of water when there's a water fountain right next to you. I mean that's my mind.

Now, if yo have water bottles, you can bring them along, fill them up. You're good to go. Reusable coffee cups, reusable bags, all those kinds of things. Use your wallet to vote. That's one of the best things. You guys don't have a lot of disposable income now. But you have enough. And your demographic is what everybody is going after.

And if you look at package A and package B, or good A, compared to good B, and A has got a whole bunch of packaging all around and it's excessive. And package B is really thinly done, and it looks nice, and it's made out of recycled materials, you buy that. If that's really something that you feel for. And so using your wallet is one of the best ways to vote in this country. And so by doing that you can start to evoke change.

Because when businesses see that people are buying it because it's recycled, or because it's easier to recycle, they'll start making things that way. And that's just the way it works. And so just be conscious of your consumption.

So some of the keys to having a successful recycling, like I said, keeping the costs down. You can't be too much higher than virgin polymer cost, it's just not going to happen. Minimize your carbon economic footprint. So try to minimize how much energy is going into a system, or how much oil you have to use, how much transportation you have to use.

Looking at the market what will customers buy that's recycled? A lot of people don't want to fly in a plane that's recycled materials. You know a little edgy on that. It's the kind of things you got to watch out for. Which markets are the best? Where is the low hanging fruit, that easy access materials that you can go in and replace with recycled materials?

And then the performance. You just can't compromise on performance. You can sell the story that it's recycled for so long. But it's got to perform just as good as the other products in that market. And then the mindset, changing the mindset of people to know-- traditionally recycled materials are always kind of looked at as inferior products. Changing that mindset and making products that are not inferior, and they're the same, or even better, is really a big, big concern.

And then telling the story. Like I said, the story is good, that you're recycling. That's a really great way to kind of sell your idea is that it's recycled material, or it's easy to recycle. You designed this material to break down easily so it can be recycled. That's a great story. It's not going to be your business plan. But it's definitely part of it. You shouldn't shy away from that. But don't rely on that as your main driver.

Now, the keys to this in developing countries, or other countries besides-- I was just down in Louisiana last week. And it's like a different country compared to the Northwest, as far as recycling. I mean nobody recycles down there. And it's just non-existent. I was on the LSU campus. And they had some around the LSU campus. But once you got outside the campus, no. It was really kind of-- a little unsettling. That's the way it is.

So when you get out into Brazil, or wherever you may go, capital and operating costs are going to be probably different. We are very, very fortunate in this area to have very low electricity rates. You go in to some third world countries, or developing countries, their electricity rates are astronomical. But then again their labor cost may be cheaper. Cost of living is a little bit cheaper, which is unfortunate, but yet you supplying them a job is also a good thing.

Understand your local market. If the US market is selling deck boards and everybody is buying them, that's probably not what's going to happen in a developing country or another country that doesn't have houses as much, or they don't have as much space. So really understand what people want, how you can sell that product, the product line, and where you're selling it to.

And then understand the culture and people. And that's a really big thing when it comes to recycling. And you know it's an act of passion a lot of times. Because people are passionate about it. So you try to figure out what makes people tick in that culture, in that region.

And what makes people tick around here, probably doesn't work everywhere else. Like if you were in a seaside or a fishing community, and you sold them the story that, if you got rid of all the plastic that's in the ocean it would encourage or enhance the fish populations, because fish won't be dying from plastics going into them. That might be something that you can grab a hold of and you can say, this is why we should recycle.

And then I always try to work within their system. As soon as you start taking-- so if you were to build a recycling facility around here, you would be taking away money going to a dump. Because the dump gets paid when you drop trash off there. So you got to make sure, if you're doing a recycling program, you don't pinch off somebody, and get somebody pretty pissed off at you.

So always understand the system, how they're getting rid of this plastic this time. And if it's wrong, then you change it. Do whatever you can.

So I think that's my time. Is that good enough? You guys have any questions, or is this?--

CHRISTINE OAKLEY: Do you have any questions?

CARL ENGLAND: Yes?

AUDIENCE: What's the life cycle of bioplastics? What is the shelf life of the bioplastic products?

CARL ENGLAND: Well, you know, so if you make something out of starch. So like something we're making out of starch, forks and cut-- for picnics and that kind of stuff, cutlery. You put that into the ground it'll probably degrade in a couple days, or it'll start breaking down in a couple days. And if you make something out of polylactic acid, which is a little bit more developed polymer structure, it probably takes about six to eight months to kind of get that thing-- so it really depends upon the type. You know, biopolymers is a really big class of polymers. And then some of them, like I said, don't actually degrade. Or they will degrade over 10,000 years, something like that.

AUDIENCE: If it's exposed it will take longer?

CARL ENGLAND: What's that?

AUDIENCE: If it's like exposed will it take longer? Just like, if it's exposed to the environment.

CARL ENGLAND: Yeah so, most of these things, most of the biopolymers to get them to degrade, are going to need some moisture, and not frozen temperatures. They're going to need to be able to break it down, the bacteria and the organisms that break those things down, and then water to get in there, to kind of break it down.

AUDIENCE: What did you mean by recovered plastic films? What is that?

CARL ENGLAND: Recovered plastic films? Oh, so well that's another term, I didn't really get into recovered. And that's kind of like the step between diversion and recycling. Somebody has recovered it and they said-- so they actually have what they call material recycling facilities that will actually bring in the material. They're kind of the middleman of the recycling. So they recover it, and they have it, and then they sell it on the market, kind of thing. So that's a recovered plastic stream. Any more questions?

CHRISTINE OAKLEY: Now is your chance because after this just--

CARL ENGLAND: Yes?

AUDIENCE: Can bioplastics help the soil at all, or do they do not degrade?

CARL ENGLAND: So if it's a true bioplastic it should break down into its base constituents. And so I am not a new soil nutritionist at all. But I would imagine it probably wouldn't do any damage to it. I don't know if it would promote it or make it worse. But I kind of doubt it would do a whole lot of damage to it.

Do you have a way to get anybody online, or do they have any way of getting--

CHRISTINE OAKLEY: No, they are videotaping.

CARL ENGLAND: They're just stuck out there? OK, oh they're videotaping, great. Yes?

AUDIENCE: So how does the manufacture of bioplastics, in terms of-- I guess, [INAUDIBLE].

CARL ENGLAND: That's a really big question. So there are some aspects of it that are very similar to traditional synthetic plastics. And then usually where you're different is on the front end. So if you're going to make something out of corn you've got to break that corn down, get the sugars out, ferment the sugars into ethanol, and then the ethanol turns into--

AUDIENCE: But then you can take it too.

CARL ENGLAND: Yeah, exactly yeah. And there are some subtle differences but the general rule of thumb is that you can do that.

Good. Well, good luck to you guys. Oh, sorry.

AUDIENCE: If I remember correctly, plastic is a little bit stronger in tension, rather than compression, but if you use like a wood plastic composite, does it make it better for tension situations? Do you think [INAUDIBLE]?

CARL ENGLAND: So plastics are very good in tensile strength. They're kind of low in tensile stiffness. And so the wood in there actually stiffens it up and makes it a little bit more rigid. If you want to put it that way. Yes?

AUDIENCE: So, is it 70% of the plastics used in the US that come from landfills?

CARL ENGLAND: No, it's bigger. So when I showed you that graph before and it had those two items that were 30% recovered, that was only itemized out. The overall recovery is-- what was it? Like three out of 30, two million? So 10%, something like that. Yeah. It used to be like, five, 10 years ago, it was like, maybe 2%. I mean it just was nonexistent. So we have come a little bit away, trying to put a positive spin on this. It's difficult.

Metals are a beautiful material to recycle. I mean, Nucor Steel over in Seattle, and a couple others, they just take all your metal and turn it into rebar, because the energy density is there. You put 95% of the energies already consumed even when you bring it back as a recycled product. So you only have to add 5% more energy to get that into the same steel product. So it's a real easy thing to do.

Plastics, they are low density. They're dirty. They're difficult to deal with, but then again, that's what makes it fun, exciting. Yes?

AUDIENCE: What's the biggest bottle neck in the whole process as far as cost, and production lines. Is it most expensive, breaking all the-- you get all these plastics coming in from all different sources. Is it more expensive to break it it all down, or to actually refine it into new materials or whatever you're trying to do?

CARL ENGLAND: That's a good question, because-- I don't know if there's a clear answer to that but I'll give you what I think the big answer is.

Once you get it into that-- we're talking about that recovery facility-- once you get it there, it's pretty good at that point in time. Because it's in the system. People are looking to buy it. It's the logistics, really. It's how do I get-- so if I throw this thing into the bin, and everybody else throws theirs into the bin every day, and we bring it out to the recycling facility, what do we do with it then? Who takes it?

China's been taking it for the most part. We don't have an infrastructure really set up to do much with our plastics. It's getting better. And they are doing a lot with, especially bottles, and milk jugs, and those kind of things. And that's why you see those values high. But it's really along the logistics. How do you get this material into the hands of somebody that can use it? And especially when it's spread out all over the whole country.

Because we don't have a lot of plastics manufacturers here in the Northwest. A lot of them are back in Detroit, Cleveland area where the auto manufacturers are. And that's where a lot of the plastics is. So getting our material back over to there for their consumption, that's a big issue.

And so having the logistics of getting that thing back into another bottle, back into a fleece jacket, back into carpet, whatever, that step, getting it to those guys that produce it. I think that's probably your biggest hurdle right now in the states. Yes?

AUDIENCE: Aside from the process of plastics breaking down naturally, are there any chemicals that you use to seal that process under controlled conditions?

CARL ENGLAND: Chloroform works pretty well to breakdown polyethylenes. There are some strong solvents that break down plastics. But they're pretty strong and pretty nasty. The chemical route to breaking these things down is good and like they do it for nylons. They'll take nylon carpet and they'll break it down into caprolactone, into a monomer form, and then build it back up again, kind of thing. They can do that in a controlled environment. And it works relatively well. But it's pretty pricey, and somewhat cost prohibitive.

But yes, you can break them down chemically. But the good thing about plastics is they resist-- you can store a lot of things in plastics, and they don't break it down really quick. So like sulfuric acid, you can put in plastics for a while and it doesn't do much to it. It's resilient. It sticks around. That's it's attribute. And it's weakness all at once. Yes?

AUDIENCE: Should we focus on what to do with the plastics? Or pushing away from using the plastics?

CARL ENGLAND: I don't know if I can answer that. That's a really good question. That is the question for everybody to look at. Do you go away from it? Or do you figure out the best way to handle it? That's a really good question. And I think that should be part of your--

CHRISTINE OAKLEY: Part of your task.

CARL ENGLAND: Part of your task, yes, yes. All right, thanks a lot guys. Good luck.

CHRISTINE OAKLEY: I think you were a real good lead in for your next task. Those of you who-- all of you have tagged on you that you've identified your team. So you may want to take the rest of the time to find members of your team if you haven't met with them already. Brainstorm some ideas or just say, hi.

One of the things that you're going to be judged on is how well your solutions reflect the interdisciplinarity of your teams. So if your team is made up of an English major, an anthropology major, a crop science major, an engineer, and a political science major-- or let's change that to criminal justice-- then your solution-- it's important for you to understand how every one of those team members can contribute to that solution.

Because as Carl said, it's not just the technology. It's not just the science. It's cultural, it's economic, it's political, and all of those things are important in such a-- not just a scientific problem-- but a social problem. And an economic problem. So all of those things, everyone on

your team has something to contribute. So you can get to know one another. What's your major? And all of those types of things, just so that you can develop solutions that do reflect all of the knowledge and everything everyone on your team has to contribute. And has value, and adds to your team's solution.

Do you have any questions for me regarding the case, regarding the rules, regarding any of that. Yes? Yes?

AUDIENCE: OK, I have like three questions. How are we funded? Or are we not? I know it's not based on--

CHRISTINE OAKLEY: When you say we, who is included in that we? You're not getting paid to do this. I just want to make that clear.

AUDIENCE: --ization that we are giving the solution through, right? Because [INAUDIBLE]. Your role is to be a part of government [INAUDIBLE] Is this like a theoretical solution and there's no-- this is how much money it would take to do this.

CHRISTINE OAKLEY: It's a real good question. Is that all three of them all at once?

AUDIENCE: Second question is--

CHRISTINE OAKLEY: Oh, wait a minute. Let me answer the first one first. So it's up to you to make that determination. You're a consultant, to an NGO who has a relationship, or a partnership with the UN. And so find out all of that. We haven't identified what that NGO is. You can do that. Or you can make that up. You can fill in those blanks relative to what you're talking about.

And the other piece is if you want to be funded by someone, then figure that out. So you are a fictional entity, but one of the keys to the solution is it needs to be realistic. Yeah, and if it's out there somewhere and it costs, you know, $50 billion to implement this in Manaus, Brazil, then it probably isn't realistic or implementable within a five year period.

OK, question two.

AUDIENCE: So question number two, so is our program just effecting that part of Brazil, or is it for entire area?

CHRISTINE OAKLEY: Just so that you have something manageable to deal with-- Brazil is a very large country-- so focus on the location of the case. Which is unique. So focus on the location of the case. Understand what it's all about. What other competing social problems there may exist, all of those types of things. Yes?

AUDIENCE: Can you take an idea that already exists in the world? [INAUDIBLE] [INAUDIBLE] -- certain types of usage of plastics, and use that-- [INAUDIBLE]. Because technically, it's not our idea, right? [INAUDIBLE]. If they're doing it in some other country--

CHRISTINE OAKLEY: Yes, you can do that. For example, I'll give you an example of last year's case. Last year's case was arsenic poisoning in Bangladesh. And so what the winning team did is they did research on all kinds of water filtration systems. And they identified one that was piloted up in Bellingham, Washington.

And looked at all the data about that. Understood what the arsenic problem was in Bangladesh, and said, maybe this particular type of water filtration might work. And we can provide a case, we can support that why we think it's worth. It might be economical, it's easy, you don't need people to manage it, et cetera, et cetera. So they used some cultural variables. They used some science. Does that answer your question?

Yes, so do your research. And no, you don't have to-- if you want to invent something that you think is really workable that would be wonderful. But you can patent it, and do all those things, and talk to Carl about how to do that.

The last thing I want to share with you is from this point on, you have your team to work with. You also have a faculty adviser. That faculty adviser's job is to help you facilitate conversations among you, so to build your organization. He or she can also assist you in the identification of resources. It's not their job to-- what solution would you like to come up with? You're an expert in this area. So utilize them as advisers and they can assist you in that process.

Other questions? Yes?

AUDIENCE: I know one of the rules is that... after today... we're kind of on our own.

CHRISTINE OAKLEY: You can't call Carl up and say, hey Carl, what do you think of this idea? Right.

AUDIENCE: Right. But are we allowed to use say, for example, contacts maybe, preexisting [INAUDIBLE].

CHRISTINE OAKLEY: I've been asked that question a lot. And I would say, if it's a part of your research. If there's somebody on your team that knows somebody who works with Carl and who does this stuff, I would say that's off limits. The job and your task is to creatively come up with the best solution that your team can come up with.

So work within the resources of that creative team. And you can do the research that you need to do. Utilize the library, utilize online resources, but really work within your team members and not go to outside experts who are going to give you all the creative ideas that you probably

already have, and can generate among yourselves. Does that help answer, Sebastian? OK. Yes, Katy?

AUDIENCE: What if we have an idea that we have come up with, and we want to find out if it is, in part, even do-able, talk to an expert, and say, hey, is this piece even--

CHRISTINE OAKLEY: Nope. It's your job to support that idea. You came up with the idea because there is evidence out there that this idea may work. And it's your job to support that the best way you can. And say, we think that this is going to work because-- and your because is evidence based, in whatever you can come up with.

The next date that you need to be very cognizant of is March 9th at noon. Not 5 o'clock, not midnight, but noon. Your two page solutions are submittable then. And you can always submit them before if you want to do that. But that is the last. Come 12:01 we're not going to take any. So get them in. Yes?

AUDIENCE: Can we email those in?

CHRISTINE OAKLEY: Yes, you can email them in. And there will be a way to submit them using the registration procedure that you did. And we will let you know them. We'll give you the URL for them. Yes?

AUDIENCE: What's the process after the submission?

CHRISTINE OAKLEY: Good question. The process after the submission is we turn all of your solutions into PDFs, and then we send those to the judges. And the judges have until March 30th to evaluate them. Sometime during that time, between the 9th and the 30th, the judges get together and compare ratings. So they will rate you on the use of a general rubric. They will rate all of those. And they will say this is-- gee, we think this is team number one. We select the top five teams to compete.

So that's how the process works. The judges get together. They compare notes. They compare ratings. And then they select collectively the top five teams. Does that help? And then we notify you. We will notify you on or before March 30th. And then you have from March 30th to April 10th to turn those good solutions into a 10 slide PowerPoint, or a Prezi or whatever mechanism you like to use, to present that publicly. That is Friday of mom's weekend, so you can all bring your mom's. Alexis?

AUDIENCE: What's the format of the paper? Do we just [INAUDIBLE]--

CHRISTINE OAKLEY: It is whatever you think the judges can read easily. So I haven't given you a format except that it's two pages, not counting a cover page and not counting references. So you guys figure it out that if you want to have the judges have easy access to what you have to say. Whatever format that works for you. Yes?

AUDIENCE: If we come up with a technical solution, like an explanation, can we include diagrams and [INAUDIBLE], or do they have to be in--

CHRISTINE OAKLEY: They have to be in the two pages, in reasonably sized font. Please. Any other questions?

Well, thank you. Thank you all for coming. I will send Carl's PowerPoint out to your team captains who will share that with you. And so that you at least have some basic information that he shared. Get some refreshments, whatever is left, and then find your team members and introduce yourselves. Thank you.