ISOJ 2020: Day 5, Online Investigations

How journalists are using AI (artificial intelligence) and OSINT (open source intelligence)

Chair: Maria Teresa Ronderos, founder, CLIP (Latin American Center for Investigative Journalism), Colombia

- **Emilia Díaz-Struck, research editor and Latin America coordinator, ICIJ**
- **Charlotte Godart, open source investigator & trainer, Bellingcat, United Kingdom**
- **John Keefe, adjunct professor, Newmark Graduate School of Journalism at CUNY**
- **Haley Willis, visual investigations reporter, The New York Times**

Mallary Tenore Hi, everyone, and welcome to our next panel. I'm Mallary Tenore from the Knight Center for the Journalism in the Americas. And I'm really excited to be here with all of you today.

Before we start our next panel, I just want to share a few housekeeping notes, and I want to remind everyone that this panel will be interpreted into Spanish. So if you'd like to join in Spanish, just click the interpretation globe in the meeting options down below and select the Spanish language channel. I should also note that we are going to be streaming this live to YouTube, both in Spanish and in English, and we'll be providing the links to those YouTube channels in the chat feature in Zoom. So if at any point you have any technical issues with Zoom, you can always tune in via YouTube.

I also want to remind you to use the hashtag #ISOJ2020 to stay connected and to share highlights from this panel today. And we definitely encourage questions from the audience. So as you're listening to the presentations, if you have questions, please do feel free to share them in the chat feature, and we will go ahead and do our best to address those at the end.

So without further ado, I would like to introduce and welcome our next panel, which I think really epitomizes one of the goals of ISOJ, which is to explore how technology is shaping the way that we report and tell stories. So this panel will focus on online investigations and how journalists are using artificial intelligence and open source intelligence. So now I'd like to turn it over to Maria Teresa Ronderos, who's co-founder and director of the Latin American Center for Investigative Journalism, and she'll be moderating today's conversation.

Maria Teresa Ronderos Hello to everybody, welcome to this fabulous ISOJ online investigations, how journalists are using artificial intelligence and open source intelligence to do their investigative reporting, to get out the great stories, to put power under the microscope and then under a very big light of the public.

So this pandemic has accelerated the use of open source investigations. I think a lot of reporters didn't even know they could use the internet to do investigations, actually finding out that this is an amazing opportunity that this pandemic has thrown on our lap.

And today we have this fantastic panel of people who have done a lot of that, thought a lot about how artificial intelligence can actually be used to improve the capacity and to accelerate the capacity of investigative journalists. So today we have Charlotte Godart. Charlotte is an investigator, and she's a trainer at Bellingcat, the very famous British-based but worldwide-impact news outlet that is specialized in open source investigations. Before she worked as Bellingcat, she was a researcher and team manager at the investigations lab within the Human Rights Center.

We have John Keefe, who is an adjunct professor at Newmark Graduate School of Journalism. John teaches classes on product prototyping and design and development at the Craig Newmark Graduate School of Journalism at CUNY.

We have Haley Willis, who is a visual investigations reporter with The New York Times. Amazing video team that we have seen such beautiful productions.

And we have Emilia Díaz-Struck, who works with the ICIJ team, the famous team that produced all the sequence of Panama Papers and Paradise Papers, nd Emilia has been an amazing both trainer, coordinator, investigator for journalists all across the world.

So welcome, everybody, and I think we're going to start with you, Charlotte.

Charlotte Godart Thank you so much, Maria Teresa, and thank you to ISOJ for having me. I'm so happy to be here with you all, even virtually. So today I'm going to be talking about something that I've been investing most of my time in for the past few months, and that's mapping violence against journalists using OSINT.

So like Maria Teresa said, I work for Bellingcat. I'm an investigator, and I lead some of our projects. And this in particular is really interesting to me because it intersects a lot of really typical or classic OSINT or open source research techniques.

OK, so we've all seen images of police violence against protesters at the protests in recent months. Specifically, and especially the Black Lives Matter protests. Beyond the brutality against the general population, journalists seem to also be consistently the victims of police violence and potentially targeted in some instances. One of the most unbelievable moments that I'm sure many of you are familiar with now is the moment that Omar Jimenez was arrested live on the air while he was reporting for CNN. And it was shortly after seeing that, that over at Bellingcat we decided we wanted to do some more research about this, see if we can take all these incidents and track them. Can we verify all the images and videos that are circulating online throughout the country? And then can we take that and create a visual database to show what police actions are being used against journalists?

So before I get started on some of what we did there, I also want to provide some context into the gravity of this specific research. As of June 5, the U.S. Press Freedom Tracker found that in 2020, and more specifically just within these protests, there have been 300 incidents of press freedom violations. This is double what they tracked for the entirety of 2019. So for an entire year, they tracked half of what we've already found in the past few months in terms of press freedom violations. This is not normal. This is not something that

usually happens. It seems to be much more frequent and much more intense in these protests than what we've seen in recent history.

So we got started with crowd sourcing, and this is typically used open source technique where we ask people on the internet for more information. In this case, Nick Waters, a Bellingcat investigator, tweeted out the third example that he had seen of the news crew being deliberately targeted by law enforcement, and he asked, "Has anybody else seen similar incidents?" In response to that, he received about 200 incidents that he compiled into a thread that's still growing. And we took those incidents, and we put them over into a spreadsheet so that we could verify them.

And what I mean by open source verification in this case, three specific things I want to point out. First is finding the original source. So we want to make sure that this isn't a video that has been circulating from a couple of years ago, that this is actually from the protests that have happened in the past few months or the protests that we are specifically looking at. Second a geolocation of the incident. So this is independent verification whereby we look at the different identifying features in a video or image, and we match them specifically to a location on a map. So that way we can say for sure, we know that this happened, for instance, at this exact corner in Minneapolis, and we could plot that onto a map. And then finally, analyzing the sequence of events in the video, so attempting to corroborate the events with other videos and analyzing what happens from start to finish to get a full understanding of what was going on.

OK, so I'm going to take you through just a quick example that we did do. This is a video that's showing a reporter in Detroit, who at this point was being detained by officers. You can see she's already lying on her stomach. Her hands are behind her back being zip tied. And I'll just play the video for you really quickly. Here.

OK, great. So as you can see, they let her go as soon as another colleague approached and said she's media. The interesting thing about this, though, is that on her back, which you can see in this final frame here, she had actually printed out her press pass on a giant piece of paper that she had taped to herself. I'm assuming for these specific purposes of potentially getting detained and having that press pass be visible to the officers who were doing so. So even though that was clearly visible, they still were detaining her and didn't let her go until someone approached them to clarify that she was, in fact, media, and then they let her walk away.

So in this nine-second video, there's not a lot of clues about where this took place. But using other videos that had been posted by her colleague just moments before, we're able to get some more details that allow us to precisely place her in space.

So in this case, we looked at his previous pictures and videos and also found a tweet where he self-reported where he had been, saying he was on East Outer Drive and Conner in Detroit. So then we went to a map, just went to Detroit, and then put in those exact street names to see if we can get a specific intersection and start from there, which is exactly what we did. This is a great part about working with journalists, is that they tend to self-report where they are. They know how important it is to people who are following the events. So great.

Once were there, we started to look at some of the other pictures he had posted from the area to see if they might match up with both the location he self-reported and the video of the journalist. We have a gas station over here in the corner. We also have this maybe

restaurant or store with an F in the sign. We also have a really distinctive wall here. OK, great. And so if we go back to our map, we take a look at the area that he self-reported, we could see if we find any of those matching features and that would at least place his pictures, which again, he posted shortly before the video in line with his self-reported location. OK, so here we clearly have that storm with the F, and also over there we have the gas station. Right. So now we know that these pictures line up with his self-reported location.

So we just want to corroborate where she was with that, too. So within the video, you can see right about here, basically about seven seconds into the video, you can see a two-level building along with some kind of a fast food restaurant over to the side of her, back there, and a flag waving in the wind. And if we go to the actual location itself, we can see, OK, there is the fast food restaurant, there is the building and there is the flag as well. So we were able to locate exactly where she was.

And that's what we did for about 120 of these incidents. And then we went we moved on to visualize them. So once we plotted them in space, how do we go from there to visualizing them? We created two iterations of the map. The first one had them just visualized in space, where we included source links that could take you to the original source of the video. And the second iteration of the map we released last week, along with Forensic Architecture, using their software and their platform time map in order to place the events in both time and in space. So now we can see exactly where something happened and also when it was uploaded. And then we can see, OK, here is when there was really an uptick in violence, and here's where it started to taper off.

Our next release of this is going to be in a while, but it is coming. And we are going to be looking at violence against all the protesters at these protests, not just the journalists. So right now, we're combing through about 700 incidents that we're working to geolocate and then place in time as well. So that way we can have a full picture of what kind of violence was happening at the protests that were against police violence.

Finally, I just want to finish off with some ethical considerations of this work, of which there are plenty and that we've had long conversations about during this time. Namely, we don't want to make this a tool for law enforcement. Right. They would also be really interested in a map that plots people in space and time at these protests. And as I'm sure many of you have seen in the news, they are using photos and videos of the protests in order to subsequently arrest protesters or find them at a later date.

We also wanted to avoid amplifying someone who did not want to be. So if someone posted an image or a video that they just wanted to share with their friends on Twitter, and then it ends up being on this platform that's being seen by lots of journalists and researchers, that doesn't align with particularly what they wanted when they posted it.

So our solutions to these two problems at this point in time is that while we thought about blurring faces, I want to point out why that wasn't the best choice, that being that you could still use clothes or tattoos or other features about a protester in order to identify them. So instead, we're going to be blurring the entire image, but potentially just leaving the sound in order to still leave in some context and the gravity of the situation, but not allow anything about the image to incriminate a protester or anyone else at the protests.

So I look forward to speaking with you about this and any questions you might have. Thank you so much.

Maria Teresa Ronderos Thank you, Charlotte. Thank you very much. I think we already are jotting down the questions and maybe we can have a little chat at the end with everybody. So, I think, Haley, you're next.

Haley Willis Yes, thank you so much. Thank you, Charlotte, for that extremely interesting presentation. And thank you ISOJ for having me. I'm excited to be here. I'm not excited that we can't all be in Austin together because I am an Austinite myself, but I am really excited that we're still getting to do this panel.

Charlotte's presentation was kind of a great introduction for me because the techniques that we use in visual investigations at The New York Times are very, very similar to the work that Bellingcat does, and we have worked with the in the past. So I'm really glad that she gave you kind of a granular look at how our work is carried out.

So for those of you who don't know what visual investigations does, is we do investigative and explanatory journalism using traditional journalism techniques. So we still interview witnesses. We still speak to experts, experts in policing, experts in chemical weapons. In some cases, we do go to the scene, but we combine those techniques with kind of more advanced digital forensics, open source intelligence, open source investigations, and that covers kind of a variety of tools. It can be using photo and video from social media, collecting and verifying it in the way that Charlotte just explained. It can also be other types of open source and openly available information like police scanner audio, publicly available government documents, shipping and export data, flight tracking data. We kind of cover that whole gamut. And the whole name of the game in visual investigations is primarily we want to be using open source information in the investigations that we're bringing you.

I think two major reasons for that. One is transparency. So transparency for our viewers in that if I show you this video, and I tell you, "I believe this is the location," you have access to all of the same information as me. You have access to that video because it was posted to Twitter. You have access to the satellite imagery to confirm the location because you have access to Google Maps. And that, I think, creates a different relationship with our viewers in how we put forth evidence.

I think the other side of the value of open sources is on a level of accountability. We always say, like we do accountability journalism and visual investigations. We do these investigations hoping that the official response will change or something will come out of it, and I think when you have such specific digital evidence and evidence that, again, can be replicated by the governments or by the people that we're kind of putting on the spot, that makes it much harder for them to come out and say, "This is not true." It's not just one person that told us that this happened and we're reporting it. It's that one person, plus five other people, plus these six videos, and this shipping data, and we're putting that to the government. So that's kind of the the whole mission of visual investigations.

I'm just going to talk about a couple of different types of digital investigations that we do and give you a few examples from each of those. So one thing we do is very traditional. Well, nontraditional, but exactly what you think an investigation is. So it has some type of reveal. We're revealing information to you that you didn't know before. So that looks like, for example, our team did a huge package of stories last year on Russia bombing hospitals in Syria. Those were the first investigations to prove that that was taking place. Another example is last July, there was a strike on a migrant detention center in Libya.

And we investigated that strike, and we actually revealed that these migrants and refugees were being held less than 100 meters from a weapons storage unit. So essentially these people were being held in a viable military target.

I think that's a very interesting case to bring up because it was a case where we wouldn't have known the story, I think, as quickly as we did without open source information. And so how that story took place is as soon as the strike happened, we had all heard about it. Declan Walsh, who is our print reporter who covers Libya, had heard about it. He was already speaking to witnesses and reporting on a print story. We came at it from the open source angle, and the next day we had a satellite image of the aftermath of that airstrike. How all that happened is one bomb had hit the migrant detention center, which is already tragic, horrific. What we saw on the satellite imagery, which you can see, is that building was hit and the building next to it was also hit. A building that we did not know had been hit, and we would not have known without that satellite image. That caused us to ask the question, "Why was this other building targeted?" And from a variety of other open sources, from videos and photos that we had received, we were able to establish that that building was the building where this militia was keeping weapons. So that kind of revealed to us what the real story was.

We thought the story was that Haftar bombed a migrant detention center, which is a story, and it's terrible, and we would have reported it regardless. But then the story kind of escalated into Haftar bombed a migrant detention center, and the UN-backed government and the EU are keeping migrants and refugees in a valid military target, and that's an even bigger story because then we could put this to the UN. We could put this to EU countries that have reps that visited this exact migrant site and ask, "Why were these people being kept in this area?" So that's one example of the kind of work that we do.

A second example is what we call like reconstructs or sometimes TikToks. This is telling the most definitive story of an incident that happened, not necessarily a reveal, because we often do this for very well known cases that took place, the most recent I worked on being the killing of George Floyd. That video went viral, as we all know. It stoked all of these protests. A lot of people saw it. And after we did our visual investigation, reconstructing that incident, the overwhelming response from viewers was, "I had seen this video, and I had no idea what actually happened." And that's because we put together all of these different open sources that told that story in a much more comprehensive way and a much more damning way.

We have this one video, the one that went viral, but there's several other videos from different angles. There's other footage. There's a cell phone video that someone across the street took. If you line up that cell phone footage with the other cell phone footage, you can see at one point three officers were on top of George Floyd's body, not just the one with his knee on his neck, which was what people initially had thought.

Other information that you can get from open source in this case, for example, is we went through all of the police scanner audio from Minneapolis in that day, and we listened to the communications between police, and EMS, and fire and found that there were several missteps. Police called EMS for a code three, which is an emergency situation, and continued to keep pressure on his body and did not provide first aid for several minutes after that call had been made.

Another example is the prosecutor in this case against the police officers involved, in the complaint against the officers, claims that the officer's knee was on George Floyd's neck

for seven minutes and 49 seconds. When we put all of the available footage together that we have, we know it was at least eight minutes and 15 seconds. So the visual information in this case actually contradicts the information that we see in the complaint, and it tells us that the use of force was more than had been initially thought. And that really definitive picture of what happened comes from putting all of this information together.

The last type, I mean, we do a lot of things, but I think another major thing that we do, aside from these reconstruction and the traditional investigative reporting is we do a lot of explanatory reporting, which is just we're going to explain to you a phenomenon or something in the news, but we're going to explain it to you using open source information. So a good example of that is we've done several police violence kind of wrap ups in places like Hong Kong, Chile, India, where it's not so much a reconstruct of one specific incident, like with George Floyd, but we're going to show you how this is systematic. We have five cases that we've broken down, and here are the missteps in each case from these videos. And again, it's all about contextualizing that with visual information.

So we had one video showing a police officer in Hong Kong attacking a protester, but we also found a live stream that showed what that protester was doing five minutes prior, which was nothing threatening at all. And that's kind of the context you need to build an extremely strong case of this was police misconduct.

So those are the various ways that we try to incorporate OSINT, open source intelligence, open source investigations, whatever you want to call it, into our reporting. I'm happy to go more into specifics, and I'm really excited to hear everyone's questions. And I'm especially excited to hear about artificial intelligence, because for all that I do, I think I'm still a Luddite in that area. So very interested for our next panelists. Thank you all.

Maria Teresa Ronderos Thank you so much. We do have lots of questions, and I'm taking down at least some to start the conversation when you will make your presentation.

John Keefe Great. Thanks. Thanks so much. It's an honor to be back at ISOJ. I love ISOJ. I wish we could all be together. And it's also an honor to be on this panel with all of you. I respect all of your work, and I learn so much from all of you all of the time. So thank you.

I am going to shift a little bit to the world of artificial intelligence, specifically how machine learning, which is a version of artificial intelligence, can be used and has been used for investigations. And I'd like to just give you some examples to give you a sense of when it might make sense for you, because it seems very mysterious, and it seems like artificial intelligence, "oh, it must be all knowing and all powerful." And in reality, it's not like that. It's actually, the analogy we have been using, and I was doing this at Quartz for the last year. But, imagine an intern or a small room of interns, but these interns have not been to journalism school. They have not lived life at all. They have no morals and no ethics. They actually don't know much about the world. All they know is exactly what you told them. And what you told them is to look for a certain pattern or group things together, and they're very good at that. They're very devoted and committed to helping you, but they don't know much about the world. And that's sort of what machine learning is like in journalism when you're looking at using it in the newsroom for your investigations or as we've done for our investigations.

So I just wanted to give you a little sense of that. So here is a quick little example. These are two pictures of helicopters in New York City. These are police helicopters, little maps of police helicopters. And we have hundreds of these, or we had hundreds of these at

Quartz, just sort of as an experimental prototype of what we might be able to do. And our question was, "Could we get a computer to recognize when a helicopter is circling?" So you can see that yourself, and you could even train a little roomful of interns to say, "Hey, sort these all these pictures out. We have hundreds or thousands of these pictures. If they're circling, put them in one pile. And if they're not, put them in the other pile." And the thing about this is that a circling helicopter is more interesting, especially if it's a police helicopter, then a helicopter that's just flying straight and on its way to some other place.

And we actually were able to train a machine learning model to recognize this, which is pretty exciting. And we turned it into a little Slackbot. So whenever a helicopter was actually in the air and circling, it would send us a message like this. So this wasn't necessarily the case where we were going through an archive, but more something that was happening live.

Another example, is so that's a pattern, it's the circle pattern. Another example of something we did at Quartz, where we wanted to check Facebook ads to see what the Democratic presidential candidates were focusing their advertising on. And in this case, we made a bunch of buckets. We trained the computer to say, "Hey, here are some examples of ads about gun control. Here are examples of ads about the economy. Here are examples about ads about beating Trump." And again, we could teach the computer to say, "Hey, here's what these things look like. Now, we want to give you a whole big pile of them, and you put them into the buckets for us because it would take us a long time to do that ourselves." And in fact, it led to this story here, and this graphic, where you can see, for example, that Joe Biden was focused like almost all of his ads that we were analyzing were focused on beating Trump. And you can see in the middle, Elizabeth Warren, her ads were focused on the economy. So that's, I think, very intuitive. That's kind of what we have seen politically. But we were able to pull these together. This is from 68-thousand Facebook ads, and we were able to do that without having to look at 68-thousand Facebook ads, because we have the computer do it for us.

Another really amazing example is at KPPC, which is a public radio station in Southern California and L.A. area and L.A.X., which is part of KPPC now, early in the COVID pandemic, at least in the United States, we're talking end of January 2020, they posted this forum that said, "What are your questions about coronavirus, and how it's affecting you in Southern California?" And there's a box, and people just put in question. Well, this was very early in the outbreak. L.A. had just seen its first case, and people had lots and lots of questions. In fact, they very quickly got a thousand questions. So KPCC is a team that isn't that big, and they had made a commitment to actually answer every question. So through a fun series of events, they ended up chatting with us, and we helped them.

We were able to make a model that just took those 1000 questions and just looked at them, the language that was used, and grouped them into buckets. Now, in this case, the computer didn't know the names of the buckets, and in fact, we hadn't given names to the buckets. What we just said is, "Group these into a dozen different buckets. Pull the similar ones together the best you can." And what happened was that you can look through within each bucket and say, "Oh, these are all about unemployment in some version or another. Oh, in this bucket is mostly or almost all about schools closing." So this was early in the pandemic, and the concern was that are schools are going to close? When are they going to close? There is also another bucket about prescription medicine, "Like how would I get prescription medicine if I can't go outside?".

And what happened was that the station was able to use this. First of all, they could give a bucket to a person and say, "Hey, could you answer all of these. They are all very similar questions." And again, they wanted to answer every question, and so that made it easier. The labor of dividing that was done by the computer. The other thing was that it gave them a sense of what people are concerned about. Here are a dozen things, a dozen topics, that they could then use to program their talk shows or even have a live event, back when we could have live events. They actually had a live event. And what was interesting about this, too, is that they got so good at this that people, more and more people started subscribing to their email subscription, and they also got more and more people searching for KPPC in the process of just trying to get basic questions answered about COVID.

They're up to at this point 3,900 questions. They've answered 3,600 of them, and they're trying to keep going. And so this made it a lot easier for them, and it was actually pretty straightforward to do.

And the last example I wanted to share, and Emilia will talk about this too a little bit more, but we worked with the ICIJ team on the Luanda leaks project. And the Luana leaks project involved 700,000 documents, and these are documents related to Isabel dos Santos and Angola. And 700,000 documents is a lot. Like you can imagine going through 700, maybe even 7,000. But 700,000 documents is just too many to go through, even for dozens and dozens of reporters.

So how could you start looking through 700,000 documents? Well, you can put them into a search engine, and actually ICIJ does this. They put the documents into a very basic search engine that you would be familiar with, like it's almost like Googling. So in this case, you could look for board minutes. So in this case, finding board minutes in this trove was a big deal. It was very useful for the reporters. But what if the document you want doesn't say board minutes, or what if it was in another language? That was the case. What we were able to do is actually run it through something slightly different, which is called a universal sentence encoder. This actually gives a very complicated score to every sentence in this document trove, and then you can actually use those scores to find similar sentences. So we were able to say, "Look for sentences like 'establishing a new corporation.'" And the universal sentence encoder says, "Oh, well, I found this document here. This page number on this document, and the phrases 'of the firm as newly constituted,' which has none of those words 'establishing a new corporation' in it, but it's similar to a 'newly constituted firm' and that that may be useful." And the super cool part about this is that the universal sentence encoder has many languages and was able to detect the same phrasing in Portuguese.

And I'll just wrap up by saying in this case, the day this report came out, the subject of the investigation tweeted out saying that this was basically fake news. And who would believe that anybody could have read 715,000 documents? In a way, she's right. We couldn't read them all. But we used machine learning to help find the documents we needed anyway.

Maria Teresa Ronderos Super, John. Very exciting all the examples that you have given us. I think it's now time for Emilia. I also have lots of questions for John, so we'll go to that in a minute. Emilia?

Emilia Díaz-Struck Yeah. Thank you very much. Thanks, Maria Teresa. Thanks, John, Charlote, and Haley. It's an honor to be here. Thanks, ISOJ, for the invitation. So we'll continue talking about machine learning. And actually, as John was saying, like when people hear the word "machine learning," people think about robots, or they think about

social networks. I don't know, something abstract. But we started thinking about how can actually this help investigative journalism? And that is the key question. So how can we use it not only to see what's going on with machine learning? Can it help us? And in our case, as you might remember from many of our investigations, we deal with lots of data, regularly, with millions of records. So starting to use machine learning began as a response of our own needs. We didn't use, full disclosure, machine learning for Panama Papers. But the first time we used machine learning was with Paradise Papers when one of our data analyst, Rigoberto Carvajal said, "Why don't we experiment with this?" And we said, "OK, let's start finding problems with that."

So we have had a few projects where we have had different examples where we use machine learning, and we keep fine tuning and figuring out when is this an answer, because it's not magic, and it's not the response to all our journalistic problems. So we need to deal with the time issues, time constraints. So we need to decide when do we embark ourselves in a machine learning adventure? So it could help us find a needle in a haystack, but what if we have a haystack full of tiny needles the look the same? Could we find more than one needle in a haystack that is similar to each other? So when we talk about this vastness of documents that are also in multiple formats. And you might see this photo of this beautiful desk from a colleague in Italy, and all of the desks of our investigative journalists looked like that full of papers. Imagine putting that all in digital and navigating that. And you have all these records. They're not checks for novels. They're financial documents. And some of them are structured. You have some spreadsheets there, but many of them are not structured. That means that you have text, and text and text. How do you navigate that? How do you screen millions of records?

So when you talk about machine learning, you talk about finding patterns, you talk about classifying, and there are different kind of models that you could use. We have clustered, classified, and I will walk you a bit through our experience. I see myself like this has been really a team effort. I see myself as that bridge connecting all these different worlds and figuring out how machine learning can help us. And again, connect machine learning and our reporters need to understand why does it help me? Because the problems that we're going to respond with machine learning need to be journalistic problems. We can't just let the computer figure it out for ourselves, so that expertize from each reporter that they say, "Oh, I found these documents, and these loan agreements actually are super meaningful for our investigation. Can we find more of these kind of documents?".

So there are different uses, and I will walk us quickly through some of those examples. So in one case, it has helped us to find leads. And that's part of the reporting process. How do we mind these millions of records? Back in 2017 with the Paradise Papers, we had 13.4 million records. And out of those 13.4 million records, about 35,000 were linked to Glencore, a big multinational, and still who reads 35,000 records? So in that case, that was our first experiment. I said, "OK, can we find all of the loan agreements tied to this big corporation? Can we find the transactions tied to those loan agreements?" And in some cases, as John said, some documents would say "loan agreement," but in a lot of cases, the documents would look similar, but not exactly the same. And then we basically taught the computer to identify loan agreements for us, and that was part of the key reporting process. And then the reporters would get a spreadsheet, as you would see there, and they would navigate and say, "OK, these are the documents I'm interested in. And I can see the amounts and I can see how big the loans were, and look what kind of structures and deals Glencore was doing.".

So that is one part of the process. And we did something similar. We did a partnership with Quartz IA studio for the first time with Mauritius leaks, and then we use it to identify it, we had there more than 200,000 documents. Again, a large number of records, all different from each other, and that was to find financial statements. And as Jeremy Merrill, who worked with us together with John, said then, "While AI didn't do anything a human couldn't do it, the knowledge of the journalist was essential, it did the job a lot faster, freeing humans to do other tasks." So then the humans had already those spreadsheets, and they could just navigate and go to sources and continue with the reporting.

But there is a human computer component, and we need to be careful because the machine is not always right. And I will walk you through a different kind of process, where we had like a full process and we got numbers at the end that we did in 2018 with input files. Basically this was a project where like the full machine learning involved a full team, data analysts, data journalists, researchers, reporters, fact-checkers, editors, everyone was involved from the beginning. What happened? We taught the computer to identify patients' deaths. So basically implant files explored the medical device industry. And we were, for this specific exercise, identifying patients' deaths to find cases in which the events reported to the authorities were misclassified, so were classified as something different.

And to understand this, when we are working with machine learning and data sets like this, this was a data set of about eight-million records, it was the FDA's MAUDE database, where people report adverse events tied to medical devices. That data was already dirty. There were many issues that are not machine learning issues, but are data issues that we needed to deal with, too. So that's just a warning. It's just not only machine learning.

So basically what we found, and I will walk you quickly through, is we found more than 2,100 cases in a five year period in which a device had cost the death of a patient, but their deaths were classified as malfunction or as an injury. And it actually goes through the process of how devices are approved and then monitored. Like if you don't know that these devices are causing deaths or that the numbers are lower than what they really are, then authorities might not put an eye on them so quickly.

So then we found out if those 220 in which it was clear that the device may have caused or contributed to the death. So this started actually with an initial set of phrases from an expert and our reporting saying, "Oh, this is how I'm finding these deaths that are actually not reported as such." So we would find something that it was reported that the patient expired, and the classification was malfunction. So then with Rigo, we actually created our own dictionary out of the database, like all the descriptions that described what the event was and the real death classification. We started building sentences. So we got like about 100 sentences from the expert and the reporter. But using this process, we got 3,400 key phrases that allowed us to identify the death. So based on real death reports in the data, we created our own dictionary, let's say. And then, we ran this to identify all the misclassified deaths, so we taught the computer how to identify a death.

Here's the caution. We started finding false positives, and there comes the human element of this. So sometimes the patient had a dead battery, and sometimes the father of the patient passed away. And then actually it was like refining the process. And that human element of like going through the results the machine had shown us that we were able to do it. And we had a full verification process afterwards, through those more than 2,000. We had a full team fact-checking the results of the machine, so we could actually present those numbers and be sure that the patient died and was the device involved in the death?

Something that we're doing nowadays, too, and that connects. And I will also end with Luanda Leaks is actually integrating our machine learning results to our technology. So we have Data Share. Data Share already does entity extraction. It shows us like places. It automatically recognizes people, location and organizations. But something that we wanted to do, in the past we have provided the reporter's spreadsheets, is how can we provide this to non-spreadsheet people? How can everyone get the benefit of machine learning? So what we did is with those 750,000 records, we started integrating those results into our technology, so people would just go and click on minutes, or banks, or contracts and then be able to explore all of this.

So the key for us is understanding what is the process, understanding the data. It's for partnerships. We have also developed partnerships with Stanford while Marina was at the fellowship there, and we keep doing partnerships with others to learn from each other. But you need to identify which stories need machine learning, what is the approach? You need to document the process. You need to understand that it's not magic. It's not instant. It takes time and hands. But if you engage your newsroom, then at the end you might have a reporter telling you, I need machine learning.

Maria Teresa Ronderos Thank you so much, Emilia. This has been amazing. I just had a couple of questions just to warm up all of you who are listening and seeing these amazing panel. One of the first questions I have is for Haley and Charlotte. You guys are all day long watching videos and watching videos of nasty things like journalists being beaten all day long, or watching videos of people being blown up in Syria or hospitals being blown up. Do you think there is a kind of trauma? Do you think there is a problem for those who work on these video investigations day in and day out? Do you take care of that? How can you protect yourself from such a hazard? Maybe, Haley, do you want to speak about that?

Haley Willis Sure, I'll start, and, Charlotte, feel free to jump in. I think both of us actually have quite a strong background on this exact topic because we used to work together at the same investigations lab, where the question of vicarious trauma was something that we focused on a lot. So this question of how does spending hours a day analyzing footage of police brutality or chemical weapons attacks impact you? I usually come at it from from two lenses. One is just like, what are some techniques you can use to minimize the chances of vicarious trauma? And there's really small things you can do. Watching a video without sound can be really helpful because crying and screaming and explosive noises can be even more traumatizing than the footage itself. Taking screenshots of the footage and looking at those isolated instead of watching the video over and over and over again. If you can just screenshot the element that is really important to you, like I want to find this building in the background. So I'm going to separate that from the body in the forefront of the video, for example.

The other way I look at it is just like personally, how do you deal with this, and how do you reckon with the issue? Because I think we face a lot of the struggles that I think many journalists who cover these issues, even if they're not doing open source space, which is why do I have a right to feel traumatized or affected by it when I'm not living this? I'm covering it. I'm safe in New York in my office, or my new office, my bedroom. And there's guilt that comes with that. And I think that's something that everyone has to reckon with. And for me, I think it comes down to self care and recognizing the fact that vicarious trauma is a real issue. It's not selfish, and it actually sustains you. So you can continue to do this work for a longer, and you can continue to cover these issues and hear these people's stories because otherwise you're going to burn out. And that's not good for you,

and it's not good for the journalism, or for the people that we're trying to get accountability for.

Maria Teresa Ronderos There's also this very good feeling, and I had it when we actually worked together in an investigation, one of the first investigations we worked together, CLIP and Bellingcat, which was being able to be in spots that are too dangerous for real people to actually go. Because when we were investigating the murder of a journalist, and it was amazing how we saw it. We were able to go to the place where nobody could go, to actually not ask questions, but actually be in the place through satellite, and mix that with social media and get a lot of responses. So is there also like a good effect of these things when you actually feel that you are part of a huge collaboration, that you're actually lowering the danger for journalists when you are doing this kind of work, this kind of open source work?

Charlotte Godart Yeah, absolutely. I mean, I think it's not necessarily lowering the danger because there are still people on the ground taking videos and posting them and potentially still being in those areas. But it does feel, I think, gratifying to be able to amplify those individuals. So the way we're seeing citizen journalism on the Gaza border or, you know, in Syria, for instance, and we can use those videos and images and amplify them and build investigations out of them without having to actually be there ourselves. And I think that's definitely one of the advantages of open source.

And then I think specifically, just selfishly for me with this recent investigation, I'm American, I was born and raised in the United States, and I've been living abroad for the past year. And when all the protests broke out, as a journalist, but also just as an active civilian, I was feeling really weird about not being able to be there and not being able to lend my support to the movement or to just be there to document what was happening, especially with violence against journalists going on. So, you know, it was almost like this cathartic release for me to be able to work on it here and feel like, "OK, at the very least, I can collect what all these people are doing to film this on the ground, and I can verify it and make sure that their names are recorded somewhere and that, you know, this violence that was done against them is not going to get lost in a Twitter feed." So, yeah, it definitely can be very rewarding as well as difficult at times.

Maria Teresa Ronderos I think we don't have any more time to have these chats. But I just have one closing question for John and Emilia. A lot of the journalists that are here actually fear artificial intelligence because they're going to be replaced by those little interns, John. And actually they are being replaced in many parts because these interns learn very fast how to write simple news and do very, very basic, but very, very tight and very precise reports. So is this a way to get ahead? If you feel frustrated that you've just lost your job, you've been replaced by a machine, is this a new way of actually using machines to get ahead in your profession instead of having yourself being crushed by the machines?

John Keefe It's interesting that you bring that up. I actually did just lose my job because of the COVID crisis and the downsizing happening, and it had nothing to do with the machines. I was working on the machines. You know, there's a lot of people doing work to generate stories, right. To produce at scale sports stories, business stories, stories that might be fed by data, sort of templated kind of stories. That is happening. And there's some real successes with that happening. There's a whole sort of field looking into the generation of stories. And I think automation in the workforce, in any workforce, is something that's absolutely an issue. I think what's happening here in the work that Emilia

and I have been doing is really about harnessing what is already being used by social media networks, by banks, by law enforcement. Like the notion of using machine learning to get through huge troves of documents or something like that basically enables some reporters to do stories you just couldn't do or wouldn't do.

I mean, if somebody drops a million documents into your email box, the stories you can do with that are going to be pretty limited unless you get some help. And so I think it's empowering and giving some extra powers to investigative reporters who are already using their journalistic skills to do this. You know, so I think it's a related issue, but I think the more you do this, actually the more you also understand how to cover when machine learning and A.I. is being used in your community, used to decide who gets the loan, used to decide who gets the job. So there's a lot of benefits to it. Sure, there's going to be problems, and we know about A.I.'s many problems, but I think there's still room for using some of this for investigative purposes to do good work.

Maria Teresa Ronderos Yeah, that's what I meant. It's like it empowers journalists instead of them feeling being depressed about the future.

Emilia Díaz-Struck Yes. I wanted to briefly say, and that's what I was saying before that for us it was a real team effort. So actually, the machine learning process didn't take anyone out of the process itself. We needed everyone. We needed the editor. We needed the reporter. We needed a fact-checker. We needed a researcher. Plus the programmers. Plus everyone in the newsroom was engaged because when when you talk about investigative journalism, you need to verify your findings. You need to verify what the computer shows you, like, what the results are. And if the computer is learning wrong, you need to give it an input to the computer. So you still need the humans there. So that was essential. Like, when we did endpoint files, we had 11 people fact-checking the results of the computer, so that tells you a bit like you need humans, you need machines and you need time. So the effort for the kind of work John and I are talking about is I think this is just empowering journalism and investigative journalists and actually giving us the opportunity to see things that we thought perhaps, "Oh, are we missing something?".

We always ask ourselves, "Did we miss something when we did the Panama Papers?" Technology helped us a lot, but what if we had used machine learning? And that's what we are doing now, experimenting with that and figuring out how can it help with our work? But humans, reporters, editors are essential in this whole process. There are many questions you need to ask as an editor, as a journalist when you're getting the data.

Maria Teresa Ronderos So at the end of the day, you have to report against your own prejudices because your prejudices can also be passed on to the actual algorithm.

Well, thank you very much to everybody. We're going to go now to questions from the public, and it's been really a pleasure to listen to you and thank you to ISOJ for this opportunity.

Well, so we are now open to questions from everybody. We have this amazing amount of questions, so I'm going to ask everybody to be very short with the answers, please.

So somebody is asking, Haley from The New York Times, it seems to be difficult to get footage from CCTV and aircraft radio conversation, or maybe you would need to go through a FOIA to get that kind of information. How do you do it so fast? Because it looks like it's very, very fast.

Haley Willis Yeah, absolutely, that's a great question. Two parts to that question. The first part, I think, is there's a lot more information publicly available than I think people realize. So, for example, there's this thing called Live ATC, which is where air traffic control is live streamed online, publicly available. You can listen to that. You can listen to communications between air traffic control and pilots. A lot of police scanner audio and 911 dispatch audio is publicly available through sites like, Broadcastify. Things like CCTV are very frequently published online through a variety of sources. Police audio cam is sometimes released publicly by the police departments. In the case of the Libya migrant strike, the CCTV footage that captured that was just released by someone on Facebook. So part of it is just knowing what's public and not closing off your mind to what things seem like they might be unavailable when they actually are.

The second part is there are things that aren't publicly available, of course. Sometimes to get CCTV footage of an incident you have to contact, just call, normal reporting the store and ask, "Did you have CCTV camera running during this? Can we see the footage?" In the case of the Russian bombing of Syrian hospitals that I mentioned, the team had Russian pilot radio traffic. That was not publicly available. It was received through a source.

In cases like that, we still place our reporting in open sources, so to show you that this CCTV or this Russian radio traffic that we got is real, we're going to use open sources to confirm it for you. So you hear the coordinates, we're going to show you in satellite imagery, which you can access, that those coordinates were actually hit. Or we're going to show you that the police scanner audio that's publicly available matches up to the timing that we see of the George Floyd case in the CCTV, which we got through the restaurant owner whose restaurant filmed that.

So I think speed is a question of a lot of different things. It's about knowing where resources are, knowing how to get them quickly, and in some cases it is about having connections and sourcing on information. But for us, it does always come back to verifying that information, regardless of how we got it through open sources and being transparent about that.

Maria Teresa Ronderos Thank you. They're asking Charlotte, in Bellingcat do you have your website, all these things that you have mentioned in your presentation? And also can people learn from the website in Bellingcat where they can find all these tools and all these things that Haley was talking about? Where do you find the things?

Charlotte Godart Yeah, so you can on our website find information about the tracking we're doing with regards to the protests in the United States. So there was an article almost a month ago published now when we first released the first iteration of the journalist map, so that one is on our website. And then I would recommend if you're interested in following what we do, to follow our Twitter account, which is just @Bellingcat, and that's where we'll be posting updates whenever we release new iterations of the map. The Forensic Architecture map is also listed on their site. So if you go to Forensic Architecture, you can find the map that they've created with us there.

And then, yeah, one of our missions is to teach others how to do open source verification and really share the knowledge. So we have plenty of guides and resources on our website when it comes to tracking flights, when it comes to reverse image searching, geolocation, using TweetDeck, pretty much almost all the methodology that we use in our

articles and in our research, we have at least one guide about on the site. So if it's something that you're interested in learning more about, I recommend reading those. They're freely available. And if you want to go even further, we also do virtual workshops as well, where we teach people how to do the type of research we do, although those free resources are also really great, and I highly recommend them.

Maria Teresa Ronderos So a question for everybody is do you need to be a journalist to do open source investigations or to use artificial intelligence to do investigations? This is for all the panelists. So maybe we'll start with you, John.

John Keefe So clearly not, right? Anybody can do a lot of this stuff. In terms of machine learning, what's happened is that a lot of the software libraries originally were really, really hard, at least for me, and I was not trained in computer programing, really hard to use early on. But over the years, different libraries have become easier and easier to use to the point where journalists can use them for many purposes, and now we do.

There is a small movement to encourage the use of machine learning beyond just the tech community and beyond just math people to use it to do things that are about tracking deforestation, wildlife conservation, lots of different ways that we might use machine learning, it's exciting that it's coming into the realm of the doable for somebody who wasn't trained in computer science.

Maria Teresa Ronderos Anybody else wants to say something or add something?

Emilia Díaz-Struck Yeah, so for instance, the other areas where they're using machine learning is in the medical industry. So with the team we were working with at Stanford last year, they were actually working with hospitals to use machine learning to train models to identify better X-rays, so doctors could get insights on what is going on and help analyze X-rays, and among other things, our medical records. So that's another use case that is not in journalism, like where machine learning is helping too. I think there are many fields where we can see that. And we're just starting, there are others like machine learning has existed for a while. So we're just starting incorporating it into our processes.

Maria Teresa Ronderos Charlotte and Haley, people are asking how do you identify videos that they are not fake? Because you can see they say sometimes they post videos that are actually very old, and they claim to be recent. And then somebody else asks, how do we know if audio is fake or not fake? How can you check that?

Charlotte Godart Yeah, I could maybe speak to the first part if Haley you want to talk about the audio part? So if you want to make sure that a video hasn't been recycled on the internet, which happens all the time, it's a kind of a two-part answer. The first part is doing your basic due diligence with any kind of online content. So reverse image searching it to see if you can find images from that video or the image itself online before and doing that in as many search engines as possible. So not just doing it in Google and calling it a day, but actually going through Yandex and Bing and trying to get as many different results as possible. That's your basic reverse image searching.

But then from there, there's a bit more of a mindset you have to have, which is thinking as someone who might be trying to fake you out with this content. Right. So if you were the one that was trying to spread this, where would you go to get it? And what kind of searches would you use to find this? And can I replicate those searches and see if I come across this content when it was actually posted five years ago? So this is something that

we do for pretty much all content we get to make sure that it hasn't been recycled because that is so prevalent. It's a combination of reverse searching and also just some smart searches and thinking like you would if you were faking people.

Haley Willis Oh, yeah, definitely. I would echo that. On the audio side, audio can be a bit trickier because there's not as much visual information to work with. You can't just reverse image search it. You can't geolocate it because there's nothing to look at. So I think for audio, it's a two part thing. The first is just knowing the source of that audio and knowing it really well, the same way as if you're a traditional reporter. If you have a source in the Department of Justice giving you information, you want to know that source well, you want to know their biases, where they're coming from. It's the same for audio sources. So these websites like Broadcastify or OpenMHz that posts police scanner audio, we've spoken to the people that run those websites. We've spoken to the people that have specific transponders that pick up the communications and just building up that trust with the source can be really helpful.

The other side of it is cross referencing with other information. So, again, if we have four videos that we know are legit, we've verified them in the way that Charlotte just explained, does the audio we have match up to what we see going on? Do the witness accounts match up to what we hear in the audio?

So I think just going into it again with the mindset that people might be trying either maliciously or not maliciously, they might just be posting something and not realizing. And so I think we always go in with multiple working hypothesis that, like, this may not be real, so we're going to go through every process to make sure that it is.

Maria Teresa Ronderos There is a question for the Emilia specifically. What are the core technical roles you need on a project to properly structure its ML capacity? I would guess it refers to artificial intelligence capacity and open source investigations. What do you need in terms of the people and the skills? What would be your core team if you were to set up these new projects?

Emilia Díaz-Struck Well, if we build a dream team, I will keep adding people. But no, there are a few things. So data analysts, developers, so people who have coding skills. But there are some nuances. They need to have a critical mindset. Do they know how to detect when what you have in front of you is a machine learning problem and not other kind of data problems? And the technical skills. Some of them have worked with with Python, and also have a creative mindset to keep exploring which other tools you can use to use machine learning. For instance, John, talked about the universal encoder system. We have also explored a Snorkel, which works with labeling functions and Python. So there are many different options you can use when it comes to machine learning. So you need someone who could adjust themselves and figure out what are the problems, but also a team player, because for us it's a team work. Because you need someone who can listen and work with the reporters and also hear, "Oh, these are the kind of documents, or are these ares the kind of data I'm working with. These are the sentences that are leading me to my problem." And then work with others to validate and verify your results and refine your process. So that on one side and also on the technical level, depending on the size of your problem, the size of your data, you might also need good service machines to run the processes. So sometimes your own computer might not be sufficient if you're talking about record size Panama Papers or other kinds of records that are millions of records at a time.

Maria Teresa Ronderos There are two questions that are a little bit similar to all the panelists, what do you do when you live in a country where things are difficult? For example, there's no satellite image, or they don't work, or they're very old, or when you have very closed information? Somebody from India and somebody from Guatemala said, "You know, we we have very little access or technology is very expensive." So what do you recommend to people who have limited open information and a lot of expensive technology?

Emilia Díaz-Struck Well, I learned a lot out of that, and I'm happy to jump in. Like I'm originally from Venezuela, where you actually have some of these conditions. And the answer to us at the time, and that's how I landed at ICIJ, is collaborations. So you end up finding information about your country in other countries. You end up partnering with other people. So nowadays, the fact that you don't necessarily find records or you don't find data in your country, doesn't mean that it doesn't exist. So go to events like ISOJ and others and meet people who are trained with the skills and who can help you. Partner with universities, find colleagues in other countries. Like your data, like it might not be there. But if you are following the money, people put their money in Panama, for instance, so you might have colleagues in Panama helping you find records of people from your country. So nowadays, collaborations are, I think, the best answer to this.

Maria Teresa Ronderos Charlotte, they're asking regarding your work with Forensic Architecture. If you could expand a little bit more on that?

Charlotte Godart Yeah, definitely. Is it possible to share my screen? I would assume maybe. Here, if it is, let me try, and I can just show you what the map looks like because I didn't really do that.

OK, so this is on the Forensic Architecture site, it's usprotests.forensicarchitecture.org, and they created a really fantastic little video that also explains how we use the platform and where we got the information. A little bit more of a description here. But then if you click on explore the platform, you are taken here, which is a map of the United States, and each of these circles is an incident. So if you click on the incident, it'll give you some information about where it happened, the name of the reporter, and then it'll also show you if we have a video or image associated. In this case, we don't. But for most of them, we do. Yeah. And so then you can see more information about that. They're also plotted in time at the bottom. So you can see when there was an uptick in violence against journalists and when it started to kind of taper off and become a bit less. So I don't want to take up too much time, but this is where you can find it. And if you're interested in exploring the map or if you have suggestions for, again, future iterations of it, I'd be happy to hear from any of you.

Maria Teresa Ronderos I think we're running out of time, but I had a question that is very interesting for all the panelists, and maybe, John, you can take this one to start with. Do you think I mean, artificial intelligence is being used by humans to change and to speed up the work, but do you think that it is changing human intelligence? Do you think it's changing journalism? The way we do things? The way we think about things?

John Keefe I don't think so, not yet. There's not enough folks doing it, I think. That would be my quick answer. I might think about it some more and have some other perspectives. I mean, do you think?

Emilia Díaz-Struck Well, I think yeah, I think we still need to have more people working on this, but at the same time, we are starting to explore things or think about things that

perhaps we didn't think would be possible before. So that's the beginning. Where like before we would say, "Oh, I have all these records. What do we do? And like, oh, it would take me three years to go through them and read them." Nowadays, with the use of technology and machine learning, we're thinking, "OK, this is possible. This could be an answer." But we still need to fine tune the process. What are all the components? How do you get things right? What happens when the computer gets things wrong? Like when you're teaching the computer? But it's a space full of opportunities for journalism.

Maria Teresa Ronderos Charlotte and Haley, maybe you could leave one really good recommendation because many people are asking about what are great tools that you can tell people to use? What are your favorite tools?

Haley Willis Yeah, I always say, "open source is about how you think, not about the tools," because I think people make it really about the tools, and it's really just thinking. What's the question I have, how can I solve it? On the question of tools, Bellingcat, First Draft News, Citizen Evidence Lab are all great resources to actually see specific tools you can use, like TweetDeck, flight tracker, stuff like that. I think just generally, if you want to get better at this and practice it, start really simple. Ask your friend to send you a photo of where they are and try and figure out where, using any resources that you might have. Satellite imagery, other photos on their Facebook, a restaurant behind them. Can you find that? And that's a good way to get into this, and then the tools kind of add on as you start to get in the mindset of how to do open source investigations.

Charlotte Godart I was just going to say that I think that the greatest tool in open source research is the open source community. So if it's something you're interested in, I highly recommend reaching out to people who do this on Twitter, following them. Most of them only started doing open source research like five years ago. We're all figuring it out together. It's really new, and people love collaboration in this space. So I would highly recommend just diving right in and not being afraid to ask questions and reach out. But yet Bellingcat also has a tool kit. If you just Google "tool kit," it's a 30-page Google document that you can publicly access. Because I'm not really sure what you research, so it's going to change based on that. But you could take a look there and see if you find a tool that suits your needs.

Maria Teresa Ronderos Well, thank you very much to everybody. This has been a wonderful panel. Thank you for all of your contributions, and thank you to everybody who's been asking lots of questions and very interesting.

Mallary Tenore Thank you all so much. That was a fantastic discussion. I learned so much from all of you, and I know our attendees did as well, and it's really helpful to see all the practical examples that you shared. I think they really helped to demystify artificial intelligence and open source intelligence. And I've been thinking about how technology is changing investigations and how at the same time the traditional, foundational principles of good investigative journalism are just as important, if not more important than ever now in this world of A.I. and OSINT. So I think Bernstein and Woodward would probably be blown away if they heard your discussion. So thank you so much.

To everyone joining us today, I just want to share a few reminders and announcements. First, I want to give a big thanks to our ISOJ sponsors. The Knight Foundation, Google, Microsoft, Univision, JSK fellowships at Stanford, the Trust Project and Moody College of Communication. Thank you for your contributions and support.

And I hope that all of you here will join us again in about 90 minutes for our last panel of the day and the last panel of ISOJ online. It'll start at 4 p.m. Central, and it will focus on how to fight deepfake and cheapfake videos, along with the challenges of verifying authenticity and visual content. So you won't want to miss that panel.

And this afternoon's panels are very much focused on advances in technology. And our farewell happy hour is an extension of that. So I'll give you a hint and let you know it's going to be 3-D, and it will be awesome. We invite all of you to join us for that happy hour, which starts at 5:30 p.m. Central. And if you visit ISOJ.org and click on 2020 in the header, you'll be taken to the ISOJ 2020 page, which has more details about the happy hour. So you can click on the image that you'll find there, and you can start exploring and playing around with the platform that will be using for the happy hour. And on that same page you'll find a link to a short guide that provides more details. So go ahead and play around with it before the happy hour starts. And we really look forward to seeing you there. Thanks so much.