25th ISOJ Using OSINT and SOCMINT for war coverage, investigative reporting and fact checking

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- **Marc Perkins**, investigations editor, **BBC World Service, London, UK**
- **Haley Willis**, visual investigations reporter, **The New York Times**

Summer Harlow [00:00:00] All right. Again, the name of this next amazing panel is using OSINT, Open Source Intelligence, and SOCMINT, Social Media Intelligence, for war coverage, investigative reporting and fact checking. And I would like to welcome to the stage the moderator for this panel, who is Mark Lavallee. Mark is the director of technology, product and strategy for the journalism program at the Knight Foundation, and he brings more than two decades of experience as a software developer and technology executive in the journalism industry to this role. So let's welcome our next panelists.

Marc Lavellee [00:00:42] Let's get some panelists up here and it would not be interesting without them. Yeah. Neil Chase, get in here! Don Garcia. Find a seat, please. I will heckle you. I have explicit permission from Rosental now. So here we go. All right. It is in all seriousness, great to see a lot of familiar faces. I think I owe about half of you emails, so I'll get on it after this panel. But I'm very fortunate to be joined by so many great colleagues and panelists. Today we're going to dive into what open source intelligence is. And I guess just to put some faces to two names on, on the panelist list. I'd love to just go down the line quickly here. Have each person introduce themselves where they work and, sort of what they're bringing to this today.

Meg Kelly [00:01:44] Hi, I'm Meg Kelly. I'm a reporter with the Washington Post. I work on our visual forensics team.

Marc Perkins [00:01:52] My name is Marc Perkins. I'm the investigations editor for the BBC World Service. And I look after Westport OSINT investigations and East Europe and East Asia.

Haley Willis [00:02:03] Hi, I'm Haley Willis. I'm a reporter with the visual investigations team at the New York Times.

Eoghan Macguire [00:02:10] I am all Eoghan Macguire. I am lead editor at Bellingcat and John S Knight fellow at Stanford University.

Marc Lavellee [00:02:18] Excellent. Thank you all. So, over the 25 years that this conference has been happening, Rosental has created the ideal format for this type of session. And sometimes people are insubordinate and they don't follow that format, and then sometimes they are compliant and they do. Today we are compliant. Because I would like to be invited back. So, we're going to do a little bit of an opener here. And then each of the panelists has a great

presentation to really be able to show, the work. This is obviously a very visual part of the field of journalism. And so there's a lot of great material to show, get behind the scenes on this. I have a couple of questions to stitch those together, and we'll have plenty of time for audience Q&A folks in the room and folks watching online as well. I think to get started. I'm curious to just have show of hands of, you know, like, maybe how high you raise your hand is the measure here. Like, how familiar are you with open source intelligence and social media intelligence as a concept in journalism? Okay, so we got some pretty high hints, some middle hints. That's good. You know, I think hopefully today you walk away from this session with a pretty deep understanding, not just of what this is, but how it integrates with with journalism writ large and so how you can start to practice some of these, these techniques yourself. And for me, over the, you know, looking at the the evolution of this over the past decade or so, a lot of it's born of a truth of journalism, which is most news happens without journalists present. Right? So many of the techniques of journalism are going into a situation kind of as it's unfolding, or maybe after it's happened and using techniques to understand what did happen and be able to report that out. And in this era where most of the people on the planet have a camera, where satellites are tracking every move, globally, there's so much more of an opportunity to actually take that information. People are making all kinds of things public, intentionally or sometimes unintentionally. That can be turned into journalism. Right? And that's a lot of the craft here. That's the real opportunity. And we've seen a lot of these moments transpire over the, over the past decade plus now. Right. So one example for me, that was this sort of ah-ha moment, was back in 2016, there was a traffic stop in Minnesota. The person, Philando Castile, was shot by cops, and his girlfriend took out her phone and started broadcasting that to Facebook Live. Right. So there's so many things that that came together in that kind of a moment where, you know, the person in that situation was so familiar, they had the technology in their hands, they're familiar with how to use it. And their first thought was, this is, you know, this is how I can hold power to account just by making this part of the public record. And then being able to actually have accountability flow from that is an incredibly powerful thing and a powerful opportunity. Right? She was committing an act of journalism herself. And, you know, we can help by by amplifying that, contextualizing that, making sure that that doesn't just flow into the ether. And we've seen so many of those kinds of moments over the over the past decade plus. And so the thing I'm curious about from each of you, maybe I'll just go down the line here is, you know, as you in your, in your either as a practicing journalist or coming into this space from another field. Was there a particular moment, a story you saw or worked on that was kind of an ah- ha moment for you about the power of these types of techniques?

Meg Kelly [00:05:56] I think I come to that answer from a couple of different angles. My background is in architecture, so I was really inspired by forensic architecture work. As a young person, just sort of starting out in that field. And as I eventually slowly made a winding path towards journalism. I was ended up sort of in the fact checker space and covering, American politics in 2018. And it was the migrant crisis and a bunch of videos that were being shared online that could sort of pretty easily be debunked by geolocation, that really got me thinking about how we could, use the tools at our hands, at our disposal, to tell really compelling stories and, and hold powerful people accountable for what they were saying.

Marc Lavellee [00:06:42] Especially when what they're saying conflicts with the reality background. Yeah. That there's evidence. How about you, Marc? Great name, by the way.

Marc Perkins [00:06:51] Same. For me, it's probably 2011. So the Syrian uprising. And, so I was Head of Arabic docs at the time, and, it took Daniel Adamson, a colleague of mine said, you got to look at this guy, Eliot Higgins. He's doing these amazing things just using videos sitting in his room, you know, in England, pulling videos out and telling you this is definitely what happened. This is definitely a bomb. They hit here from that direction. And so, we managed to persuade Elliot to come in and do a training for the BBC for, like, 5 or 10 of us. He wouldn't do any more of us. I'm sure. But, by the time he came, he did a training for us, and ten of us tried it. And that was just a mind blowing week where we just went. Wow, these techniques are extraordinary. And it started from there. And after that, we built, the first myself and Dan built the first, the BBC's first OSINT Open Source Investigation longform documentary team. And that's Nemiroff.

Marc Lavellee [00:07:43] Yeah, that's, that's great. And as I'm in that era as well. Right? I mean, the Arab Spring was really one of these first moments where we saw the power of folks using these technologies on the ground to document that. Haley.

Haley Willis [00:07:55] Yeah. For me, I think it actually came from a change, a shift in fields. So a lot of the techniques that we're talking about today actually kind of came up in the field of human rights and human rights investigations. So that's where I came up as well. Doing very similar methodologically to what I do now, except it would go into 100 page reports that many less people would read than read The New York Times, or, you know, legal cases that might not see the light of day for a while. And I really enjoyed that work. But while I was coming up in that, I also started to see these same techniques get picked up by journalists. The Visual Investigations team at The Times was started, and my now colleagues back in 2018, before I worked with them to this investigation into the killing of a Palestinian medic. And that story for me, it's still to this day, one of my favorite in visual investigations. It's so powerful moving. The evidence is rock solid, and they combined it with some really strong field reporting. And I saw that and thought, okay, maybe I want to, you know, take this into journalism.

Marc Lavellee [00:09:02] That's great. Eoghan.

Eoghan Macguire [00:09:04] So similar to Marc following Elliot, a founder of Bellingcat. Around about the Arab Spring and, following the conflict in Libya that followed. As always. So I worked at CNN prior to working at Bellingcat, and I'd always been trying to look for ways and to bring open source into my work there in reporting there. And I think it was too early. It just wasn't the right time. I'd never had much luck with that. But then the BBC, actually, I don't know if you were involved. Marc, produced a piece in, I think, 27, 2018, anatomy of a killing, which went gangbusters and just an incredible investigation. And that was the kind of switch for me, like, okay, I'm definitely going to do this. I then switched to open source reporting with Storyful and then after that to Bellingcat. So yeah, anatomy the killing at the at the back and forth.

Marc Lavellee [00:09:58] And there's an interesting piece here. There are some of these organizations like Storyful and, visual forensics, architecture, forensics, forensic architecture. There we go. Third try, it's a charm. That sort of work in a space of that building, that professional practice close to. They're doing journalism, right, but we don't we have not thought about them as traditional journalism organizations. They don't have one of those 30 names. Like what? What Jim Brady was saying on the prior panel register guard or things like that. But they're but they're part of the fabric of this, right? And in my perception to date, maybe this will change over the next ten minutes or so, is that Bellingcat has kind of occupied a space kind of in that realm as well, and working with other news organizations doing their own work, but also sort of finding a way to be partners. I'm curious, as we as we move into the panel, the presentations here, to, to sort of understand how Bellingcat is, how you see it as situated in that landscape. But first, I guess two things. One, we're going to see a lot of great presentations. You know, there's the title even mentions the fact that a lot of this is about war reporting, right? I mean, this is not the lighthearted stuff. We all know this is part of our job. But maybe weren't expecting a Friday morning panel to contain a bunch of graphic material. So this is a heads up that that's going to be the case here. But as we get into the first presentation, I'm curious, you know, about how you see Bellingcat's role, but also where did the name come from?

Eoghan Macguire [00:11:32] And so, yeah. So I think Bellingcat has always been open to partnership. And I think that's one of the things about the open source community in general. When I say open source community, that's a very, very broad church. That's essentially anyone online who's interested in the subject area that could be interested in war reporting, environment and financial crimes, anything, and police violence, and any part of the world. And Bellingcat has always been open to working with all sorts of individuals, not many people who aren't traditional journalists but have really interesting skill sets. They can they can bring information to light, in terms of the name, where that came from. So it's an Aesop fable, of the mice who were afraid of a cat and they teamed up to, or they decided to team up to put a bell on the cat. So they knew the danger when it was coming, but none of the mice could, were brave enough to actually go and put the bail on the cat itself. So it's kind of them analogies, I guess, to having lots of people who are independently investigating things online, ringing the bell of danger or wrongdoing.

Marc Lavellee [00:12:42] So were the mice?

Eoghan Macguire [00:12:43] Yes. Not the cats. That's one mistake that everyone actually makes. They always think because we get pictures. People segment pictures of, like, cats. And it's like, yeah, you can't do that. It's the other way.

Marc Lavellee [00:12:55] All right. You want to go?

Eoghan Macguire [00:12:57] Yeah, sure. Okay. So, I know. Can you all hear me, by the way? Thumbs up. Yeah. Okay, great. So a little bit of the, I know there was a few hands and people here who recognized, or who are aware of open source investigations. But for those of you who aren't. I'll give a quick background to to Bellingcat. We were founded in 2014 by Eliot Argenta,

who Marc just mentioned there. When we started, Eliot was Bellingcat sole employee. We've since grown to, a staff of 35 people in the last ten years. Our most recent budget as of €3.8 million. And the reason that I mentioned this is because one of the things I want you to take away from this presentation is it is not just, you know, big news organizations are other organizations who have lots of money to spend, who you can do this type of work. With the right mindset it's possible for even the smallest to, to contribute to, to, come up with very interesting and important findings. So as, as Marc, the other Marc also suggested, we look to link up with publishing partners a lot. That's, you know, really great for getting our stories out there. And also to spread the message of of what we do. Which is, you know, really the reason that our of of Bellingcat, we're a nonprofit and we want to to share our message with everyone because we think it's important for democracy and news and, yeah, the well-being of society. And as I mentioned earlier, we love to engage with the online open source community. So to give you an example of how large that is Bellingcat has discord server and we have 20,000 people. And that discord server and it's a lot to take and a lot of time for our staff members that are in there, all the time communicating with people and, yeah, working on things. If you all want to find out a little bit more about open source investigations, that's a very good place to start. So much of our work, as I'll explain in the slides that follow, is, international in focus. But again, this, as I'll explain to you, the techniques that we use and that we're always looking to develop can be applied in regional, local and national other types of news coverage. It doesn't always have to be, you know, reporting on war or reporting on matters of international affairs. That the open source investigations can be useful. So to give an example of working with our community and one of the larger projects we've had in the last few years as, our, civilian arm project in Ukraine to what we've been trying to do is document instances of civilian deaths by you know, rocket attacks, that type of thing, harm to civilian infrastructure such as power stations, police stations, fire stations, schools, anything that has, impacted civilian life in Ukraine negatively through Russian attacks. We've we've identified over 1500 incidents, which is a lot to but again, it's important to recognize that that's probably just a fraction of the actual civilian harm that's occurred in Ukraine because the evidence we gather is as things that has been, shared on social media, our community has been key in allowing us to do this. And again, I mentioned 28,000 people in a discord server. How we approached us was that we, basically opened up to people, and our and our and our community and said, you know, we're looking for, you know, 15 to 20 people to help us verify these incidents and work closely with us. So we vetted them, spoke to them all, signed NDAs, and brought them on board to kind of help us, help us work through what we were doing. So on the left, as our as a very large spreadsheet, it doesn't look as rough as saying where we now have, a much nicer interface that to students at Stanford helped us build. But essentially what we did was we would, first gather as much social media footage of, you know, explosions of the aftermath of missile strikes, sometimes really gruesome executions of civilians and soldiers as well. And we put it in this and this database. And then, our volunteers would go through and geolocate and chronolocate. So to geolocate, that means to prove or to show that, an incident took place at a particular location and chronolocate to show that event took place at a particular time or that event took place at that place at that time. So our volunteers help with that. That would then go through a series of checks by Bellingcat investigators before it was added to our dataset. And that's how it looks on our website as a, yeah. Then if you go to ukraine.bellingcat.com, you can see that. I should've put that in the

presentation actually. But yeah, 1500 incidents. We've as that's been to me, this is a really interesting project because it's a living document of something that continues to this day. The war has been going on for two and a half years, and every incident of civilian harm that we've been able to record, this is as detailed in this. And this month has also been a very good, reporting tool for us as well, because it's allowed us to pick out themes. What is one of the I can't get over my head, one of the themes that that when I look through this data set is just how many children's playgrounds has been impacted. And I feels like every second or third, spot or dot on that map that you click on, you see, you know, an apartment block and it said debris scattered over a children's playground. So yeah, that's been it's been, an important, yeah, project for us. But and this is one of the things I want to emphasize, the same techniques and the same methods that we've used by our community are the geolocation and chronolocation can also be used for lots of other investigations. It doesn't have to be always international or war type incidents. Local reporting as well and regional reporting, national reporting the same the same techniques are useful. And that's something that I want to emphasize to you got a couple examples about that later on as well. So, yeah, in terms of this project itself, the Bellingcat community management staff has been in constant contact with our volunteers, giving direction and checking in with them, not just from a practical sense, but also from, I guess, ethical sense and making sure that, okay, and from a safety sense, because the work as hard and the work as it can be gruesome as well. So yeah, making sure that nobody's been too impacted by it by the work that they're doing. The extra level of verification by Bellingcat staff is obviously necessary to ensure that the work is done to our standards. It's been a successful project, but because of those things that was just mentioned, it's been as resource intensive. And again, like I said that a little early on, a lot of the methods that, that, that, we've used here can be, can be used elsewhere. We've begun to do that and again, the examples are forthcoming, show examples of how we've adapted these techniques to loca l stories, I guess, or regional stories in the US. And partnering with, with different news organizations in that process. And that's something that, again, as Marc alluded to earlier on, that Bellingcat is always keen to do and always will continue doing. And for us it's about, you know, and having important information out there, but also spreading the message of the techniques and how powerful they can be. So the first example that I've got is this happened in May last year. So almost a year ago, in Allen, Texas, there was a mass shooting, Mauricio Garcia, a 33 year old man who shot and killed eight people in a mall. The his name was released, publicly, but not much else. And very quickly, disinformation began to spread about who he was and, very prominent people, including Elon Musk stating that he was, a cartel member and a migrant. Yeah, which led to a lot of, I guess, racist opprobrium online and misinformation and disinformation. That was very harmful. Haley's now colleague, attic dweller looked into this, and from what he found, it was it was clear that the open source of evidence proved that a lot of this information was false. So Alec began looking into. And he began by looking for clues. So the New York Times had reporting from, anonymous police source that the shooter had had a Russian social media account. Didn't see what, social media platform it was, but that it had an account. And NBC news reported that upon the birth. So using these details, Alec began to search Russian social media addicts or Russian speakers. So that helped on Nikkei, which is, a Russian social media platform, I guess is analogous to to Facebook or very similar to Facebook. You can actually search for people by country and by by date of birth at the enter. So there was some 36 results returned for

Americans of that day at birth who had profiles and and as you can see in the red box, the third one down, was would have been an account that had been of interest anyway because of the I guess the Hitler mustache and the, yeah, that that turns out to be the individual that we were looking for, but. Yeah. So Eric, began to look into this account. All the information was open. Some of the images that he initially found. So ID card that had name and date of birth that that lines up. Okay, that says Mauricio Garcia, a speeding ticket as well. So this was, a Mauricio Garcia from Texas. It began to look and that, that so that privacy especially but as the, as in the shooter. So Eric again starts looking through, what can be seen. He finds a lot of not manifestos, but but long posts about, race, about, you know, essentially far-right ideologies. A very important piece of evidence that wasn't that the shooter came from the image of the tattoo here. So the image on the left that you can see as the image of, from the scene, it was posted online. It was, the, the shooter after he'd been shot dead by the police. And you can see the tattoo on his hand and the tattoo that, you can see on the right hand side. That was, a picture uploaded by the the owner of that social media account. So we can be very confident that it was the same individual. Then looking further into this social media uploads. Yeah. That became really clear that he was a very, very fiery individual Nazi tattoos, statues. And then on the the, the the vest there that you can see that was the vest he wore located at the shooting. This RW stands for Right Wing Death Squad. So that was again, something that we published and got quite the reaction that led to Elon Musk describing this as a sign up. He couldn't quite get his head around how someone could search Russian social media from the information that we gathered to, to find that. So and it was a relatively simple investigation that took a few hours. And we published that and I think. That was a good pushback against some factual pushback against what had been online. Another story that we we did recently, last month was locating Ammon Bundy. So even Bundy, far right agitator, son of Cliven Bundy, also a far right agitator. He had disappeared from Idaho after losing a defamation case, where he was ordered to pay $50 million to a hospital he accused of child trafficking. So when this, result came through, he disappeared. One of the things that's that's interesting about characters is they have egos. And he continued to post videos to his YouTube channel while on the run, including one entitled Winners, Ammon Bundy. So we decided to take on that challenge. And so we decided to take on that challenge. It was actually someone in our community who's who's from Idaho who, decided to begin looking at this and then after finding what he found, got in touch and said, hey, this is potentially something you want to work on us. And we said, yeah. So the videos that, Ammon Bundy had posted on his YouTube channel provided vital clues. The first one of these was, and the frame of one video. He's walking through a kitchen and you can see something on a fridge and it looks like a calendar. So we started looking at were there other calendars from other parts of. What was this calendar? What was it? Was it, could we could we find, it matching anything that was posted publicly online? And it turns out that we could. And what that was, a calendar for Iron County schools district in southern Utah. So that was interesting. Then this is various, but it was, useful clear. Another useful. clear that it was in the same location was the, it was often broadcast from the same room. So there was this I haven't included in the presentation, and I appreciate this is a Scottish person who has a picture of a Highland code. Was behind him, which was. Yeah. Funny. Anyway, so that showed that he wasn't moving around. So we were constantly in one place. But where was that place? Potentially southern Utah. He also posted another video, which is really useful. And one of the frames of the video,

you could see, and this is this what you can see in the video and, and the top frame was, a mountain range. So we took that as a still and used peak riser. So peak rise is an amazing tool. It was designed for, not for open source investigators. That's one of the things, like a lot of the tools that open source investigators use, they're actually created for other purposes. But we have, I guess, taken them in at that time for our own uses. So Peak Riser was used, or was initially designed for mountaineers. And it has a very realistic catalog of essentially every sort of hell mountain range in the world. And it's very useful for open source investigations when you want to compare mountains. You might see in a video to show that that is indeed the exact location that, the video was taken. And so we took the bottom of the bottom image is actually an overlay of peak visor on the, on the, on the top image. And yeah, the mountains match. So we're very confident that he was in southern Utah. That's in other supporting evidence. I mean, we even didn't put it in the article, but we found out the exact house that he was staying in. That that's really this to say that he was hiding in southern Utah. So we published our story has since been followed up by publications in Idaho and Utah. The Salt Lake Tribune. Which is great for us. And, although I don't think anyone's actually done anything about it, the law enforcement minister. So he's still making YouTube videos. So, yeah, if anyone wants to know where he is, he's there. So yeah, just to mention of other sort of open source U.S investigative work that we've done that, it's very possible for publications to do not low cost and not high cost, very low cost, quite simple. Identifying, a far right Texas Texas active club members in partnership with the Texas Observer. That was in February March this year. Another really cool investigation geo locating neo-Nazi and Nazi combat events in Los Angeles, using satellite imagery to show us border wall construction had destructive impacts on, the water table and, Native American territory in Arizona. Harvest again using our community to to log and archive instances of police violent violence during the BLM protest. That was again, was another massive project. And then, analyzing footage from US militias again, that they themselves posted online to show data illegally crossed into Mexico to harass and threatened migrants. So, yeah, while I hope that that you takeaway is that open source work, can complement traditional reporting methods. That's something that we really clear about, like the work that Bellingcat does. And I'm sure the rest of the panel will agree. It's, it's it's very cool. It's fun to do. The results can be impressive, but it's not a cure for everything. Sometimes you need on the ground reporting, to, to beef up what you found through open source reporting. Nothing's going to replace traditional reporting that's there. But when you combine the two, it can be so effective. Open source reporting can also be and often as low cost. The two examples that I gave you that was done by people sitting at a desk didn't have to go out. I mean, for Bellingcat, the cost was the fee of the article. And at the time that our researchers worked with with the contributor, it can be used by newsrooms of all sizes, not just the biggest, which I think is something that's really important to clarify, because when you see some of the investigations that the, you know, The Washington Post, The New York Times and the BBC and Bellingcat, I guess the it can look, Madam President esc. But it doesn't always have to be super expensive. The focus on the stories don't always have to be global. It can be local to, financial firms. And if you don't have an open source expert, you can collaborate. Bellingcat is always looking to collaborate. So please reach out to me. Or come speak to me if you'd like to. The stuff can seem complicated, but it often isn't. And yeah, a lot of times just lateral thinking. And finally it's fun. So yeah, thank you very much.

Marc Lavellee [00:30:20] Thank you. So I think as we queue up next presentation and, you know, a lot of themes here, I think we'll see reinforce, but in slightly different ways. Right. This, this idea of all these different tools, this idea that there's a volunteer community and sort of other set of practitioners. Oh. All right.

Haley Willis [00:30:42] Yeah, I guess it was supposed to be Meg, but I can go.

Marc Lavellee [00:30:45] No, this is good. Yeah. We're flexible. Yeah, right. Do it live. So I think we'll we'll see a lot of this here as well. Thank you, Duck.

Haley Willis [00:31:06] Okay. Hello. I wasn't prepared to speak for another ten minutes, so hopefully I don't mess up. Thank you so much for having me here. I'm actually from Austin myself. My family is in the audience, so it's great to be back. Thank you.

Haley Willis [00:31:25] So I'm going to talk through two investigations a little bit about, how we combine our work with traditional field reporting, since I know a lot of you are doing traditional reporting, and this is not, something that happens in a vacuum very often. And then I'm going to talk about another case where we were kind of limited to only reporting remotely. And the difference between those two things. These are both international related investigations. But I just want to reiterate, like the last speaker, we do a lot of local, domestic stories as well, January 6th, policing, immigration. So these can apply in a lot of different cases. Just to preface, I'm going to show a video briefly that is graphic. It's not extremely graphic. It's quite blurry. So you won't be able to see too much, but just if anyone doesn't want to watch, please do not feel obligated to. Okay. I'm going to skip this. Great. So. If this video plays. Oh, no. I always say, when you talk about technical things in presentations, there's always a technical difficulty. Okay, maybe I don't have the option to play the video. You know what? It's fine. You don't have to see it. Okay, so this is a video which, if it were playing, would show some vehicles driving and you would see, what appear to be bodies of people lying on the street. So this is footage that came out of Bucha, Ukraine, which is right outside of the capital, back in late March, early April of 2022. Now, at this point, and these videos started coming out right after the Russians had pulled out after a month of occupying this area. And it was very clear right away from this footage that something disturbing had happened here. And immediately, as soon as the footage came out, and there was also a Russian reaction to the footage saying, you know, these are crisis actors pretending to be laying on the street later saying, you know, okay, maybe they were killed, but it wasn't by us. And so there were a lot of narratives floating around. And this was in the immediate hours after these videos came out. And so for us, this is, you know, before journalists can get in, before we can get our own team in. And so we thought about what can we do in a short period of time that might be able to answer more questions about what happened here. So the first step is verifying the footage, which involves geolocation, chronolocation as was described. So where was this filmed? Was it actually from Russia and when was it filmed. And perhaps can we figure out when these people were killed. So, I'm skipping a lot of steps here. Geolocation is much harder than just like you find it right away, but we don't have time to talk through all of that. So here's a screenshot from the video. I'm using Google Earth Street View imagery from Bucha, which is publicly available. We were able to match it to the exact location.

So there you can see that's the Street view imagery. It's a little bit older from 2014. But you can see it is in fact the same location. So that was a little bit of the easier part of this. Now we can feel confident that this footage was from Bucha in Ukraine, but Russia wasn't arguing that it wasn't right. They were more so arguing either these people were until at all, or we had nothing to do with it. And so we kind of were asking ourselves the question of what kind of work can we do to see whether that's true or not. So this is a statement by the Russian Defense Ministry that they put out on Telegram in the immediate aftermath. And a lot of the work we do is kind of what is the official narrative and what does the evidence say about that narrative? So in this case, here's the official narrative. It says, sorry, it's a little small for me reading on the screen "during the time that Russia was in control of this town, not a single local resident suffered from any violent action." So that's obviously a very strong statement to say and then they also give a specific date of when they pulled out a butcher, March 30th. So that gives us some claims to start testing against. So a colleague of mine, Maliki, had the idea to use satellite imagery to see if we could establish when these people had been killed. So satellite imagery is basically a photo taken from the sky in the case of Bucha it can be extremely helpful because for that 30 day period there was little internet, little power. So a lot of people weren't able to share things, post things, know what was going on. But a satellite can still take photos during that period. So this is a satellite image, from March 19th, which was while Russia was still occupying the town. And if you zoom in a little bit on the satellite image, you'll see what appear to be bodies on the ground. Or kind of from your perspective where you're looking now. Dark shapes lying on the ground. Some of them you can actually see. I don't know how clear it's showing up on the screen here, but some of them you can actually see what appear to be arms or legs. And again, this is before Russia has ever pulled out. They pulled out on March 30th and this image was taken on March 19th. So we saw this image and, you know, it raises a lot of questions about this idea that these people hadn't been killed while Russia was in control. And just as you do with any other form of reporting, where unless it's the best source in the world, you probably want to do a single source story. We corroborate with various types of sources to establish what we know. Right? So in this case, I might have another problem here. There's a video that's supposed to play. Sorry. You're not going to get to see it. It's published on the New York Times website, so you can go watch it. But essentially what the video would have shown is we had lined up the satellite imagery with that video that I showed you before, and we individually matched up where each person was laying where different cars were parked, you know, where somebody's bicycle had fallen, to conclude that, in fact, these people that we saw on the satellite image were exactly the same people that we saw in the video, which right away tells us these aren't these aren't crisis actors, right? Nobody is laying in the exact same position in the street for weeks. And it also brings into question Russia's claim that there was no violent action while they were in control of this town. So because of that, we published this story, which is very short, which basically just describes exactly what I told you. And immediately we were able to put out some information that called into question what Russia was saying, but there were still a lot of unanswered questions. Right? We didn't know who these people were. We didn't know how exactly they had been killed or who had killed them. You know, they could have been executed by a Russian soldier. They could have been killed by errant Ukrainian shelling. So there were a lot of kind of questions remaining. And that led us into a nine month investigation, which included several field trips to Bucha by some colleagues of mine. And kind of speaks to

the value of combining this reporting with traditional reporting techniques. So, this is a very, very crude map that we made in the first two days after these videos started coming out, which essentially shows along this one street everywhere where we saw evidence of a body, a person who had been killed. And so this is kind of the open source evidence we started with. And our team that went into Bucha a few days later had this open source evidence as something to drive the fieldwork. Right. So essentially, we had a list of people that we wanted to know who they were and what had happened to them. And my team members could go into the field, speak to the neighbors, in the houses where these people had been killed, try and collect cell phone footage that somebody from one of those houses might have filmed. Try and collect security camera footage. If there's a house across the street that has a security camera. So in this way, the open source reporting kind of led the field reporting. And then it worked back and forth. Right. So, in the field, my colleagues were able to collect a lot more visual evidence. Right. So here is a screenshot from security camera footage, which captures what you see. There is a Russian military vehicle. This footage, which again is not going to play, but it doesn't show too much. This video shows this military vehicle firing a shot down the street. And with a variety of visual evidence, we were able to establish that the shot fired in this moment killed a man, Vladimir Petrovsky. So this captures the moment that somebody was killed. We did a lot of work to figure out who those people were. So we used Facebook missing persons posts that that had been posted to Facebook throughout the month while Bucha was occupied. And then my colleagues did a lot of work with coroners, medical staff, law enforcement to get, death certificates and other official documents to help confirm people's identities. And then a big question for us when we went into this larger investigation was who was responsible? And not just, you know, the Russians are responsible, but we very specifically wanted to be able to point to a unit, to a commander that comes a little bit from some of us on the team having a human rights background. Like I mentioned, if someone were to go to a court of law, you can't just say the Russians did it. You need to have a unit. You need to have someone to put on the stand. So for us, that was really important part of this investigation. And we found visual evidence in the visual was collected by my colleagues that helped us do so. So this is just one example where some of the vehicles had markings that we had seen in Bucha, and we match those to previous videos that had been posted by the Russian military of the same vehicles to establish which unit was involved. This was a very time consuming process that involved watching a lot of video released by the Russian military. But in this case, you can see that those two are a match. Here's another example. And by matching what we saw in Bucha, which was very low quality, we couldn't see a lot of detail with these previously published kind of military propaganda type videos. We were able to figure out the exact unit, which is the 234th Air Assault Regiment, of the Russian military, which led to this investigation, which talks about all of that evidence, as well as this investigation, which is focused in particular on the people who were killed. So that is, I think, really speaks to the power of combining different types of reporting, like we would never have been able to do these two larger investigations without having people in the field to collect the visual evidence, to interview people, especially identifying who these people were. It was extremely key to the work that we did. Okay. Now I'm going to briefly talk about one other investigation. And in this case we didn't have the option of fieldwork. So as most of you are probably aware, Israel has for the most part, blocked access to Gaza for journalists. And so we have largely been having to report what's been happening there remotely. Back in October,

there was a strike on Jabalia, which is a refugee camp in northern Gaza. And, it was a mass casualty of that, many people were killed and, us, as well as many others were able to establish by analyzing the damage, in particular, the size of the craters that had been left from the bombs, that, 2,000 pound bombs had been used in this case. For anyone who's covered many conflicts, which is true for many of us on this stage, bombs of those size are extremely rare to be used. These are some statements about the size of the weapons that the US was using in its air war against the Islamic State in Iraq and Syria, and even 500 pound bombs were being called into question for being used in that case. So the fact that Israel was using 2000 pound bombs in heavily, densely populated areas was concerning. At the same time, Israel had been messaging to people in Gaza to move south for their safety. So they were starting their ground operation in northern Gaza. And they had been saying, for your safety, evacuate south of the Wadi Gaza line. And so we had the idea of, can we combine these two ideas to figure out how often they're using these extremely large bombs, and if they're using them in an area where people are being told to evacuate, too. So it had already been pretty clear from work of amazing Palestinian journalists in Gaza, that strikes were still taking place in the South. And so we thought, you know, what can our work add to this? And it's the scale, both the size of the bombs and also how many are being used. And what does that look like across South Gaza? So what we did is we actually did a little work with artificial intelligence, with which I am definitely an AI skeptic. But in this case, I had my mind changed by a colleague of mine. We used AI, to help identify craters that would be created by a 2,000 pound bomb, and trained the AI model to look for them in satellite imagery. And then we went back and manually checked everything. So every single crater that the AI found, several reporters looked at and looked at with munitions experts to get to a number of how many of these 2,000 pound bombs had been dropped in Gaza. And this is definitely an undercount. But that was kind of the first approach we took. So we ended up with a map that looked a little bit like this, which gave a sense of the the broad scale at which South Gaza was still being bombed after these evacuation orders, but also, in particular, bombs of this size being used at this rate is pretty much unprecedented for an air war. And once we had all of these points, we used social media footage. Footage posted by the IDF tried to reach out to people in Gaza as well, to kind of zoom in on, like, every single one of these points. What does that mean for people there? And give kind of the human aspect to the extent that we can give and we can access Gaza ourselves. So I think that is the end of my presentation. But thank you so much.

Marc Lavellee [00:46:05] With so many pieces here about the scale of those individual incidents. Right. I think similar to what no one showed in Ukraine to to really demonstrate, the, the repeated actions and what the, what those full consequences are. So, I think this is a great segway to the repeatability of some of these techniques and tool building as well. Right. So got Marc with the presentation from the BBC.

Marc Perkins [00:46:35] Hi, everybody. So I'm going to talk you through, how we built a small tool, experimental tool using AI computer vision. And combine that with the investigation to try and solve in eastern Ukraine again. And I'll talk it through, how it worked, whether it worked. And I think it's also very relevant for a lot of you in small newsrooms, because although these techniques are available, they are now at a price point that they didn't used to be. So first, what

do I mean by AI computer vision? This is AI enabled software that reads every single frame. So by cutting it takes it down and drops it into 30 frames. And it will then tell you exactly what's in that in that video and it will feed that back to you. So it's literally the computer reading and reading that video. The reason this matters is that there are huge amounts of places, 70% now of the world's population, where there are critical issues with press freedom. And that means that we cannot put boots on the ground. Best thing of all is to have reporters go have a look and see what happened in reporting it. Ask questions and and if you can't do that, we are increasingly relying upon us as everyone here on this panel OSINT techniques to tell stories out of those areas. When you combine that with everybody having a smartphone and and how and you also combine that with the explosion of UGC, so that's user generated content. So that's video videos. Everyone's taking their phones uploading things. They see wrongdoing that they see that they're putting on their phones. I remember when I first started back in TV quite a while ago, the cost of a broadcast camera was $100,000 and the satellite track was half a million, and now it's all sitting in the palm of one person's hand. So all of this combined means you get an enormous explosion in this UGC content. I think it's something like 500 hours per minute is uploaded to YouTube. And that's for normal amounts of content coming out. And that that is a massive goldmine for all of us on this panel. And yet at the same time, it requires a huge amount of digging. And so what we're trying to do here with this tool or this experiment, is to see if we can shorten that down. So let me tell you what's happening with this investigation, sort of set the scene. So this is, Vulhedar, in eastern Ukraine. The Russians are pushing up pass publica trying to get into Vulhedar. Vulhedar as a whole is a strategic high ground that they want to take. And by all intents and purposes, they are being absolutely hammered to the Russians by the Ukrainians. And they're doing repeated attacks. They're being hammered so badly that actually, in a very, very unusual move, the Marines of the one of five Black Berets, which is it's the elite units out of, out of eastern Russia. Those Russian Marines wrote to the minister of defense and they said in an appeal, which is very unusual. And they said the public appeal said it on a Telegram channel that went to the governor of that region. They said to the Minsk defense, we are being sent on suicide missions. We are losing hundreds of men all the time. We have incompetent commanders, and those commanders are calling us meat, treating us like meat, to be used. So this public thing was this, appeal was spread in a way. Of course, it was all over the media quite quickly. And what we wanted to do was to, look into that and say, can we prove what if those Marines for the one, five were actually right? Are they, you know, are they right in that, in their appeal? Is that what's actually happening on the ground? But of course we can't go. So I'm going to show you a video. Maybe. Let's see. Just give you an idea of the setup and some of the problems. In terms of telling that story. Can we go back or not? To try and get back. Oh, okay.

VIDEO [00:51:02] It's difficult to interview soldiers or the families in Russia. They face years in jail for discrediting the army. But online, there's a trail of evidence piecing together online testimonies, death records and battle footage. We found that the 155 did suffer heavy losses in Vulhedar. We found reasons why these men died. Such kind of preaching operations are suicides. And we found out what happened to those caught up in a battle.

Marc Perkins [00:51:49] So what you have there. So, you know, we're trying to tell a story of, trying to prove whether this one five unit was what they said was true. So we scraped thousands and thousands, at least hundreds or hundreds of videos and all sorts of other bits of content. So you talk about Telegram channels, official Ukrainian, Russian Telegram channels, Russian officials, VK profiles from every soldier we could find in the region. What you end up is a massive bag full of stuff. And the problem of that stuff is you don't quite know what to dig through it. And it's a very specific thing we're trying to. The appeal for the 155 is very clear, but there are units spread all across this area. So if you're looking at a picture of a tank like they will Bucha the same thing, how do you know what that unit was. And so that's actually difficult. So we can say, well there's a lot of deaths but that could be deaths from any unit. So we're trying to find specific units. It's really a needle in a haystack kind of stuff and say, yes, there's been a lot this many deaths. This is definitely true. This has been happening. So I want to give an example. This is Vladimir Briskin, he's a conscript in the Russian army. This is a still video from on the right there. From his POW interview is about it when he did his obviously there are problems with POW interviews, but when he did this interview, there's about 20 or 30 of these interviews. He said he was from that sort of area, from that region 4.5, but we couldn't prove it. And what the thing that's interesting about his interview is that everything he was saying, the interview backed up. What we were finding from all these videos is popping in, but how do we verify that he is actually from the 155 regiment? And you can't because he's not he's in Ukraine. So how do you how do you how do you verify that? So, what we did is we basically grabbed video as most things and used built this tool to see if we could then use that tool to connect the dots to the digital breadcrumbs and push it back, would do that automatically. So if you imagine with this big pile of stuff, data we've collected, how do we get that? How do we find that particular person somewhere? So I'll let, in the next video. This is Ned. Ned is an OSINT analyst and journalist who works with us. Him, along with another developer called Oskar. They built this little tool called Recognize, which we then applied to it. I'll let him tell you how he built it and how it works. Oh. Say. I'll go back and forth. I yeah. It's right. It's one minute, but it's any minute then. Okay. I think it's missing one line. So this is the Recognize tool. And what it does is you take your video. It's extremely simple. You put it here, you scrape this video. So it's an inbuilt scraper that goes out to these TV, to the various different social media channels, scrapes video, puts it into a big pile. And then you throw to there's, there's Vladimir. You throw Vladimir's picture into that and it will use facial recognition and it would use object detection. And it will also use content moderation to filter out to the various different kinds of videos. So those three things and what we've built. So you've got a, you've got a basic scraper, the grab stuff, and then you've got three different filters that can be applied, the most powerful of which probably is facial recognition. I'll take you through some of those. So did it work? Yeah, so one thing did work. It was relatively cheap. And I'll come back to this point later on. But the facial recognition was very useful in the case of Vladimir. We literally took a still from video, threw it into these hundreds of videos, and within a minute, two seconds, it found 3 or 4 different points where he was sitting that that is very difficult to do manually. So if you go back three, four years, we've been doing this manually, but having people looking for the same face, different videos, this massively speeds up the process. And it was also something that you probably couldn't even do manually, because if you imagine the number of young sort of Russian men old look exactly the same with crew cuts, they're trying to find those men amongst thousands of videos. It's very, very difficult.

So the facial recognition is very good object detection, where they basically tell you what's in there. So that will say if you're looking for a tank or truck, you can actually type in truck and it will go and look for trucks in those videos also very useful. And then content moderation is something that I would really recommend everyone looks at. This is used obviously by in sort of big YouTube CMS prices, where they want to basically take out bad stuff. And what they do then is they, they so when you say we'll give you pornography, we'll give you violence, we reverse that process and we basically look for the bad stuff in effect. And that service has huge amounts of content. I'll skip to the end here. So what's the stated plan and what's next? So, I mean, one thing I should say that these capabilities have been for years. It's not that unusual for what has, as in with the NSA, with the military, with the things they've been using these techniques for years. This is the first time, though, that we get to play with these things, because we've now got a cost point that's possible. The $9,000 you can build a tool quite quickly took us about three weeks, 3 or 4 weeks. And that will give the capability to go and do these kind of processes for OSINT production. I think this is just the very beginning of this kind of process. And, I'm pretty sure we are now at the stage where some of those core journalistic principles. Right. So who? Facial recognition. What? Object detection. Where? Geolocation and when chronolocation are pretty close to being automated. Thank you very much.

Marc Lavellee [00:57:27] Thank you. It's exciting. We're seeing some of this tool building. I mean, similarly with the work your colleagues did at the times with the machine learning algorithm for the craters. Right. And sort of this, this whole set of tools being stitched up, we have Meg, who's going to take us home with her presentation and, questions are coming in online while, she's talking any any folks want to put questions in, we're going to try to synthesize into one wrap up question, after this presentation so we can get out to lunch on time. So take it away. If we get the slides, we need the slides, the slides, the slides.

Meg Kelly [00:58:23] I can give my little intro while we find them.

Marc Lavellee [00:58:24] Yeah.

Meg Kelly [00:58:26] So my name is Meg Kelly. I work with the visual forensics team at the Washington Post. We compete and do a lot of similar things to what the VI at the Times does. And I think one thing that I always like to stress about this work is, you know, we often show these examples that are sort of big and splashy, but it really can cover all types of, different subject matter. So, Marc was asking me why there was a baseball player in my slide deck, which maybe y'all will get to see. And essentially it's because one of the stories we did ages ago has to do with sticky stuff. So using visual research, using sort of open source techniques is one way that you can dive into a whole realm of resources. And sometimes they're super resource intensive, like using a computer program to kind of crowd. And sometimes they're really, really, you know, almost some high school kid is going to look at me and be like, you have a job doing this. Like a 22 year old girl in a situation said, well, 100% have a better job than I do at some of these. And so using things like knowing how to search Facebook, knowing what demographic is going to be on what social platform or how to best, put together a mind map just like you would if you were going on vacation, can really be totally useful tools. So if I have slides, I basically

was hoping to show two stories, that in both cases we used different techniques to fill in holes in that story. So in one case, we used 3D modeling and the other we used audio analysis. And then a third story, which similar to the example Haley showed, was actually from Myanmar a few years ago. But all of the techniques that we use in that story were totally free. Essentially, there was nothing, especially fancy or high tech about it. But it was a great I think it's a really amazing example of how to report remotely, especially in places where, as we all know, as journalists, it can be really tricky to get to. This is, I think that's all I got as an intro blurb.

Marc Lavellee [01:00:28] Well, come on, come on down. We can chat about some of these things. Thank you. This is. I appreciate everybody's flexibility. That was great. And the slides are great. There's a lot of great visual material. The good news is, most of it is on washingtonpost.com. So, you know, you can view it there as well. You have a byline page. So check it out. I guess one of the themes here, is really about collaboration, right? Both within news organizations, across news organizations, between folks who are, you know, the work that you do in traditional journalism, and things like that. I'm curious just to kind of, sort of take us, take us home here as you've been doing this kind of work, what is what have you found surprising about about those dimensions of collaboration, especially for folks who exist completely outside of newsrooms and news organizations, like the volunteers that that Bellingcat works with and, and experts who can come into the fold in this. Jump ball.

Eoghan Macguire [01:01:38] I've found it really interesting being able to pull in. Experts from a variety of different backgrounds who are and this is a phrase I'm going to steal from a student at Stanford's who are keen to play internet detective. And that's kind of what it feels like sometimes. So people who may have a background in chemical weapons can spot the thing that journalists can spot, and then they'll go and try and write their article and pitch it to, I guess some of the people up here on stage are people who are experts and, you know, marine traffic, and they'll track ships who are, taking oil from Ukraine illegally or, or grain from Russia. So bringing them in and having them part of the journalistic process, I think, is a positive thing. Again, as Marc you've pointed out and it's like a really important point to hammer home: collaboration. Yeah. So that to me has been has been one of the most rewarding, one of the most interesting things to kind of help those people have their after stories out there and the genius that they have and, and put it into a format that, yeah, I guess you see on the likes of Bellingcat, The New York Times, the BBC, in the Washington Post, I think we've all collaborated with those types of people. So yeah, that's something that I think is, I would encourage, I would encourage other newsrooms to do the same as well.

Marc Lavellee [01:03:05] Anybody else on that? On the collaboration front.

Meg Kelly [01:03:08] I guess I would just say that, you never sort of know how the collaboration might end up solving a case or bringing a key piece of information. One story I chat about a lot is the Shirin Abu Akleh case. I'm working with audio forensic analyst, and that helped us actually prove the proximity of Israeli forces, where the gunshots were fired from. So we knew where they where we had done their geolocation and chronolocation. But the physics that the audio

analysts were able to do, which is well above my pay grade, gave us that distance. And so knowing where the gunshot came from to where it ended up was a key finding.

Marc Lavellee [01:03:46] Fascinating, right? Building all these pieces of information to be able to then counterclaims.

Marc Perkins [01:03:51] I think one thing is there's also a kind of hive mind that's out there. A lot of it's on Twitter videos and community out there. And if you reach out to them, they will support you. And it's difficult I think, for organizations to promise you reach out, they tell you the answer and then everybody knows the answer. So it's quite tricky to manage that because you're handling, you know, it's a very difficult balance between what you can hand out in terms of information you've gathered some of it as source protection issues and stuff. But if you do put it out there and ask that hive mind, it's phenomenal what it gives back. It's like a multiplier, you know, for your journalism as you.

Marc Lavellee [01:04:24] So sometimes you're working with a, you know, very well known, established expert, in a field and in some ways maybe they don't actually have a skin in the game about influencing one outcome or another. Other times, it could be somebody who you don't have any personal relationship with, right? How do you think about the prospect or reality of bad actors who are posing as people who might be helpful? Is that something that you you deal with, and if so, how?

Haley Willis [01:04:54] I feel like we could talk about that question for many years, but, you know, I find one of the best parts about this type of work is transparency. I think that's why it appeals to an audience. And I also think that can kind of, solve for this potential issue of bad actors or people trying to influence an investigation one way or the other, like the way that we do our work. Like, we literally show our work like a math problem. And so if we're working with someone outside of the Times, which we have done, you know, it's not us. They send us stuff and it goes into the story like we check ourselves within the Times. I'll ask my colleague, like, what do you think about this video that I looked at? And we'll independently come to the same conclusion. And the same goes for working with external parties as well. Because of the way that this work works, they can show their methodology to us and we can recreate it and match those conclusions.

Marc Lavellee [01:05:56] That's great. Okay. So, for folks who are independent journalists work in smaller organizations. I think you've shown a lot of sort of entry points for being able to do some of this work, learning about some of these specific tools that can help with things like, I didn't know about Peak Visor, is it? Yeah. Amazing, right? I mean, there's so many of these little nooks and crannies of the internet. Aside from going to journalism courses.org, and taking the course from 2020, is it, around these techniques? You know, what are what are some other entry points for people who either want to learn how to do some of this stuff on their own within their newsroom or, you know, find some of these collaborators or, you know, I guess, tap into this hivemind.

Marc Perkins [01:06:44] I mean, it's all out there.

Marc Lavellee [01:06:47] Where? Where is it?

Marc Perkins [01:06:48] You can go to Benjamin Strict the brigade OSINT analyst used to work with us. He's got a YouTube channel that shows you what to do, and it's on Twitter. I mean, if you just literally put OSINT into Twitter, you'll find a thousand things and it's all learnable. That's the point about open source. There's nothing. It's complicated. It's not easy. I'm really bad at it. But. Which is why I'm glad I'm a manager, but actually, but it's not. There are lots of people who can just do it in your own time. These things are all learnable. They're not rocket science, but you can learn it by yourself, and it's all out there.

Eoghan Macguire [01:07:20] I would also say so. There's tons of YouTube videos out there. Bellingcat we have, a guide section on our website as well that details the methods, even more detail that we're doing. The stories explains exactly how you use particular tools or how we uncovered information for certain stories. Our discord server, as well as just, again, 28,000 people just constantly just talking about how they've done things or ideas that they have. So there's lots of ideas on there and even just, yeah, going on Twitter. It's still useful for some things. And looking for OSINT or open source where people who are talking about the latest tricks or the latest techniques that they've come up with, this is a good place to start to.

Marc Lavellee [01:08:04] Okay, last question. Haley, how did you get into this kind of journalism?

Haley Willis [01:08:14] That's a specific question.

Marc Lavellee [01:08:16] I'm assuming it's from a friend of yours.

Haley Willis [01:08:21] So, yeah, I mean. This is similar to what I said before, but I do think this because of the way that this work is done, this methodology is applied across many contexts, right? So people are doing it in the human rights field. People are doing it in the legal field. People are doing it in the government and military, which is where the term open source intelligence comes from and journalists are doing it. And, you know, I started this work through human rights investigations. But I think the one of the beauties of me coming to journalism and many others is the way that there's much more of a movement between fields than maybe there would have been 25 years ago in journalism, because there's a trust in the methodology, like my evidence threshold is the same in my job now as it was in my job prior, and it just looks a little bit different, a bit flashier than it did before and it reaches a different audience, which is really valuable. So I think that's what made me make the move into journalism is, a change in approach toward, yeah, maybe wanting to reach a different audience than I did in my previous work. But, yeah, that's one of the great things about this field.

Marc Lavellee [01:09:46] For me. It's really heartening. Right? To hear about all of the information that's out there about how to do it, how to build their practice, how to be part of a

community of practice and in doing this work. This is something that we can take on. It's not like I do not want to diminish the complexity in this, in the skills that you've built, but it is approachable, and that there's a lot of opportunity for more of us to be doing more of this in service of our communities and our audiences. So, with that, thank you all so much. This has been really wonderful and enlightening for me. I hope for the audience as well. So, Meg, Marc, Haley. Eoghan, really appreciate it. And, from here, we have lunch, so thank you.