

## Video Transcript – Unseen Connections – A Natural History of the Cellphone

Announcer: Many of us depend on cellphones every day. Our use of them is having a dramatic impact on our culture and our planet. How are cellphones intertwined with a globalized world? Scientists are studying how these devices are altering our lives, and the lives of millions of other people [00:00:30] who interact with them. Join us now for a conversation with anthropologist, Joshua A. Bell, to explore our unseen connections to cellphones. Now here's your host, Maggy Benson.

Maggy Benson: Okay, how should we hashtag this?

Joshua A. Bell: Anthropology rocks?

Maggy Benson: Good one. Science How?

Joshua A. Bell: Yeah.

Maggy Benson: We're live.

Joshua A. Bell: Oops.

Maggy Benson: Hey, thanks for joining us. We're live here at Q?rius, with another episode of Smithsonian [00:01:00] Science How? So, happy to have you here, to learn about cellphone science. We're joined by cultural anthropologist from the Smithsonian's National Museum of Natural History, Dr. Joshua Bell. Thanks for being here, Josh.

Joshua A. Bell: Thanks for having me.

Maggy Benson: So Josh, can we kick off our show today by having you tell us what a cultural anthropologist is?

Joshua A. Bell: Yeah, of course. So, cultural anthropology is one branch of anthropology. And, anthropology as a discipline, is basically the study of humans, and all our diversity, past, present. And cultural anthropology really focuses [00:01:30] on humans, more or less of now, and the recent past. And we look at this thing called culture, which is one way of talking about the belief systems, the actual objects that we make and use. And the social structure that kind of binds us together and helps us to kind of form consciously, and unconsciously our identity both in the present, then over time. And how it's replicated through families, through work, through the nation, [00:02:00] etc.

Maggy Benson: That's really interesting, but you work here at the Smithsonian's Natural History Museum, where we have millions of fossils, and minerals, and plants, and animals. How does cultural anthropology fit in?

Joshua A. Bell: That's a great question, again. So, a lot of people forget that humans are actually part of the natural world, right? So, we're part of the animal kingdom, as it were. So, anthropology as a discipline emerged out of that natural history. And here in the museum, anthropology's really kind of the hinge discipline. We look at [00:02:30] how humans are impacting the environment, but also how in our diversity, we inhabit the world and make it what it is today. So, in the museum we have over 2 million objects from around the world that have been collected over 200 years of the Smithsonian's history. And that helps us to explore cultural diversity in the present, in the past, and think about what it is that we are doing on this planet, with each other and to the planet.

Maggy Benson: As you mentioned, humans are part [00:03:00] of this natural history story. So, as a human yourself, how can you be an unbiased observer of other cultures, and people?

Joshua A. Bell: So, that's all kind, of a perennial problem for anthropology. And we acknowledge first and foremost that we are biased, and the way we seek to unlearn our biases in the field, is by going typically long term, and living with the community. Since 2000, I've worked in Papua New Guinea, which is a nation the size roughly of California that is located above Australia. [00:03:30] I've worked and lived with people there for my dissertation, two years and then have been going back subsequently or had people come here. I do interviews and participate in observations, so I've learned how to make canoes, how to paddle in a canoe, helped to build a house, that sort of thing. I've sat with people, interviewed them, watched what's happened in the community, done surveys - a whole variety of tasks that kind of unpacks what it is that makes these people think the way they do [00:04:00] and act the way they do.

Maggy Benson: So, are you now applying your skills as a cultural anthropologist to cellphones, in the same way that you studied the people of Papua New Guinea?

Joshua A. Bell: Yeah. So, cellphones really kind of raise another question: what is technology doing to us? So again, it's by actually engaging with people and looking at how they actually use cellphones that we can think through some of these issues about what cellphones are really doing to us. Are they transforming us, making us better humans, more efficient? [00:04:30] Or, is it leading to some dystopian future where we're no longer interacting with each other. So, cellphones become a way that kind of look at that intimacy that emerges through cellphone use, but also then the global ways in which cellphones are part of this larger supply chain.

Maggy Benson: So, what's materialized in our cellphone?

Joshua A. Bell: Yeah, so a whole, lot of values, systems, beliefs. First and foremost, it would be the various things that are inside the cellphone.

Maggy Benson: So the actual [00:05:00] materials that are inside our cellphone? Actually, that's a really good question, because I use my cellphone every single day, and I don't know what makes it run.

Joshua A. Bell: Yeah.

Maggy Benson: I wonder how many people actually do?

Joshua A. Bell: Well, until I started doing this project, I didn't either. So that's a great question.

Maggy Benson: Let's ask our viewers right now. What do you think?

Joshua A. Bell: Let's do it.

Maggy Benson: Now's the opportunity for you to participate in a live poll with us, tell us what you think. Do you know what's inside your phone? Yes, or no? You can respond using the window that appears to the right of your video screen. [00:05:30] And remember that this is the same place that you can post questions for Dr. Bell to answer during today's live program.

Maggy Benson: [00:06:00] So, Josh we can both see the results coming in, and it looks like it's 50-50, but a small majority, 53 percent of our viewers say, "No, they do not know what's inside a cellphone."

Joshua A. Bell: That doesn't surprise me, I think, when one thinks [00:06:30] of the array of stuff that's actually in the cellphone, it's actually quite astounding. It's not let's say, unusual, given the other highly manufactured things that we have, such as cars and computers. But, the cellphone brings together a kind of interesting set of things that are unique to electronics. So, if we look at this cellphone here, we have most obviously things such as gold plating, we have copper. We have these [00:07:00] chips, which are made of various materials, rare earth or some others. Camera, the glass of which is a sapphire glass, from artificial sapphires. So, you have a range of things that go in, that come from very distinct locales, which actually make the electronics work to connect this cellphone, in various ways, to different locations around the world.

Maggy Benson: So, minerals from around the world are mined and then materialized inside this cellphone.

Joshua A. Bell: Yeah, so it [00:07:30] brings together a whole set of relationships, not only the kind of places that we see on this map here. So Bauxite, which then becomes aluminum, which is found in Australia, or elsewhere. Tin comes from Indonesia, then we look at the U.S., there's gold, beryllium, iron, etc. All these places are

sources for minerals which are found in the cellphone, and then sites of labor as well, to extract it and refine it.

Maggy Benson: So, to be able to get to the point of mining, like we see in this image here. To me owning, and using a cellphone, there must be [00:08:00] a lot of steps in between. I mean, we see here a picture of a ...

Joshua A. Bell: Kieserite.

Maggy Benson: Right, which must actually be used to mine an element that's needed for a phone.

Joshua A. Bell: So, you're just seeing also some pictures previously of tantalum, which is another rare earth material that's found in cellphones. So, the supply chain, this is a term that anthropologists use (it's from economics) to think about all the things that are supplied, literally, to the manufacturer to construct the device. So, [00:08:30] you can see in this image here, we have of course the mining, so we have a range of mining to industrial, we showed you images of that. Then there's more artisanal individuals actually making mining materials, and it all has to be refined in some way. Whether, that be factory, or smaller scale.

Joshua A. Bell: Then there's a whole subset and series of manufacturers, from small manufacturers of specific components, to then the larger companies that actually put the things together, to then getting it to the [00:09:00] store. Not to mention, the designers that helped to cook up the various ideas, the engineers. And then you as a consumer.

Maggy Benson: So, there is a huge global effort in getting these cellphones to an operational state?

Joshua A. Bell: Yes, very much so.

Maggy Benson: I can understand why they're so expensive when my contract isn't up.

Joshua A. Bell: Right, they are expensive. Yeah.

Maggy Benson: So, Josh we have a couple of student questions, do you want to take one?

Joshua A. Bell: Okay, let's do it.

Maggy Benson: All right, this one comes from Ananda, what is the extent of the environmental damage from making cellphones?

Joshua A. Bell: [00:09:30] That's a great question. The extent of the environmental damage is very difficult to quantify. And mining, of course, depending on how it's done. It's hard to quote/unquote be totally clean mining, right? Mining has its impacts, so the issue of course, is more ethical mining, such that you actually take care of

tailings and stuff from mines. Dispose of it and store it in responsible ways.  
[00:10:00] So, it really depends, but this is to say, there's really no industrial process on the planet that doesn't have some ecological impact. So, the impact of cellphones in relationship to other things, might be smaller or less, but it really depends on the processes.

Maggy Benson: Great, this question comes from Julie and Kenzie, what would happen to us if phones were never invented? Would we still be using pigeons, or do you think we would have found an easier way?

Joshua A. Bell: It [00:10:30] would actually make life a lot interesting, if we used pigeons or birds, and stuff like that. No, I think that's a great question, because it does raise (the question) how cellphones have actually changed us. And, we're going to talk about this a little later in the broadcast, but I think certainly it would change the quickness of how we talk to each other, and how we are informed about events in the world. It certainly would. How much it would change us is a debate.

Maggy Benson: I'd [00:11:00] be interested to see all those pigeons flying around.

Joshua A. Bell: Yeah, it would be very interesting.

Maggy Benson: So, this next question comes in by video, let's take a look.

Joshua A. Bell: Okay.

Rebecca: Hi, I'm Rebecca, and I was wondering how people figured out, what materials could work to make cellphones?

Joshua A. Bell: That's another good question. So, it comes down to basic engineering, right? So, from the onset of mining, and industrial manufacturer humans, being as creative as we are, have worked to [00:11:30] kind of figure out what do these elements do. So, pretty early on it was discovered that copper is a great conductor, for example, and it's pretty ... It does corrode, but gold for example, doesn't. So, through trial and error, through industrial processes, people have discovered what actually works. And this is where it's exciting because we're constantly innovating and finding new minerals and materials.

Maggy Benson: Awesome. Thanks for all the really wonderful questions. And thank you, Josh, for helping us understand how the cellphone is really a fabulous object for you to study as a cultural [00:12:00] anthropologist. Because, it really is connecting us in lots of ways, globally. We kind of went there a little bit, with some of these student questions about what happens when some of these cellphones are actually being discarded? And, it raises a good question about repair, and how often repairs actually happen? But, I think we should ask our viewers what they think about repairing your own cellphone, first.

Joshua A. Bell: Sounds great.

Maggy Benson: Here's a chance for you to participate in a live poll with us. [00:12:30] Tell us, would you ever have a cellphone repaired? Yes, or no? Take a moment to think about it, and put your answer in the window to the right.

Maggy Benson: [00:13:00] So, Josh 69 percent of our viewers, say that they would have a cellphone [00:13:30] repaired.

Joshua A. Bell: That's great; actually I'm really pleased to hear it. And it shows that actually, what used to be something that happened on a smaller scale, is slowly picking up. And that raises the fact that people are aware of how valuable and important these things are, and that the possibility is there to actually repair them.

Maggy Benson: Absolutely. I mean, I hear a little bit about the E-waste that is generated by throwing away electronics. Is this a problem with cellphones, too?

Joshua A. Bell: It is a problem, and I actually brought some here to show people. So, in the [00:14:00] Smithsonian ...

Maggy Benson: Those aren't all yours? Really?

Joshua A. Bell: No, this is from colleagues here at the Smithsonian, where we have a recycling effort under way. And most companies do this, but this is a growing problem. What do you do, if every six months new cellphones come out? And people want them, you know? How do we deal with the E-waste? In 2010, it's reported that there were 152 million cellphones discarded.

Maggy Benson: Wow. That's a huge number.

Joshua A. Bell: So, that's literally half of the [00:14:30] U.S. population, right there. So, the issue becomes what to do with them? And because of all the rare materials, mineral, important valuable things, that are inside these electronics, the question is you know, what do we do with them? And, so more, and more industry is developing actually to extract them, so to do large scale recycling. But there are small scale people who are actually using their own tools and wits to extract the gold, which they then sell. And then unfortunately, when [00:15:00] people throw them out, or they don't get separated out from the waste stream, they can end up in landfills, which is not great. But, then also what happens is E-waste is also exported, and this is slowly changing as environmental laws, global and local, kind of shift. But, E-waste still goes to countries such as Ghana, China, where people need the cash, and they're willing to take the kind of health and environmental risks to extract this stuff [00:15:30] out of the phones.

Maggy Benson: So, we just saw a modified supply chain there. If we're repairing and extracting some, of the materials out of these cellphones, does that mean that we don't

have to go necessarily back to the source of that mineral to extract it from the mine?

Joshua A. Bell: Yeah. Definitely. So, what happens, of course, once you start doing industrial cellphone recycling, is that can go back in. Now, the issue of course is that you can't fully get everything out, and of course, so what has to happen is that industry has to get better at recycling. But, the manufacturing [00:16:00] is such that in certain cases, it's really hard to get some of this stuff out, once it's in.

Maggy Benson: Now, why not get your cellphone repaired, instead of recycling it, or throwing it in the trash. Is there a natural aversion to repair, or is it just something, that's not available?

Joshua A. Bell: Yeah, so we've been doing some research for about a year, colleagues at George Washington University, and I. And what we found was that repair of course, for a lot of people, raises the issue of how intimate we [00:16:30] are with these things. We use them for banking, we use them for email, personal and work related. We use them for pictures. We use them for all sorts of things. And so the issue becomes, do you really want to open that ... If it's a part of you, and a very personal part of you, do you feel comfortable giving someone this device that you have to give your password code to access, et cetera.

Joshua A. Bell: Certainly, when I've done it, and I've had my cellphone now, repaired three times. You know, the first time I was a little nervous. And like, what are you going to do with it?

Maggy Benson: [00:17:00] It takes a lot of trust to give that to somebody.

Joshua A. Bell: It does, right. Right.

Maggy Benson: Absolutely.

Joshua A. Bell: And then the other issue is that people really don't know about repair, right? So, that's something that ... But, I think once people get over their hesitancy and realize that actually these things can be repaired, and this becomes part of a larger knowledge, people will (repair them).

Maggy Benson: Gosh, you mentioned that you have this intimate relationship with your phone, where you really feel connected to it. Well, I know, that even when my phone is misplaced, I feel a [00:17:30] little bit lost. I don't know if somebody else has it. I'm looking to get in touch with other people. I might get lost, without my maps app. I don't know what to do. You've studied a little bit of that, haven't you?

Joshua A. Bell: Yeah. With Joel Kuipers and Alex Dent at George Washington University, we started a study looking at ... Well, we did a study last year, looking at high school students, and teenagers, and how they use their phones. And what we found of course, was that actually teenagers [00:18:00] are one of the highest users, and

that it is deeply a part of their identity. It's how they're forming social networks of friends, making connections, taking photos. And so it's one of these things, that actually when they lose it, such as this statement that you're seeing on the screen from one of our interlocutors or informants, they're quite distressed. So, this is a technology that they have a hard time putting down.

Maggy Benson: So, I wonder how our viewers watching today, feel when they misplace their own phone?

Joshua A. Bell: I'd be interested to know.

Maggy Benson: Let's ask them. [00:18:30] Viewers, here's another opportunity for you to participate in a live poll with us. How do you feel when your phone is misplaced? Do you feel entirely lost, somewhat disoriented, no impact, or relieved to be off of it? Take a moment to think about it, and put your answer in the window to the right of your video screen.

Maggy Benson: [00:19:30] So, Josh, we're seeing a wide range of reactions, luckily only 13 percent of our viewers are entirely lost without their cellphones. But, 40 percent feel somewhat disoriented.

Joshua A. Bell: Yeah, I'm not surprised actually. I think as this technology, as we do more, and more, and as things are collapsed, other technologies. Your clock, you mentioned the map [00:20:00] function, these things have become indispensable, right? I know, when I get in a car, always I'm like, "Where's my phone?" You know? "How am I going to get to where I need to go?" So, I'm not surprised.

Maggy Benson: So, how are phones impacting culture. You mentioned D.C. culture among teens, but what about teens nationwide, or even globally?

Joshua A. Bell: This I think is an interesting question, because I think a lot of people think that technology . . . that there's a universal understanding technology. Then something like the cellphone comes out, and we all adopt [00:20:30] it, and realize, and understand. But, what we as cultural anthropologists like to argue and push, and firmly in this camp, actually know it affects people differently. And this is where culture comes in, and plays a distinct role in how people understand this operating. So, the answer to your question, the very short answer to a very long question really, or potentially long answer, is it varies. Right? So, around the world, I think people are finding that this is something they have to work through, so there are a lot of, I think what is universal. [00:21:00] Is there a lot of moral panics, where people kind of like, "What is this doing to us?" Is this creating new tensions between generations? We find the cellphone is, within the forty years that it's been around, it's the single fastest technology that's been adopted globally. So, new language is emerging, texting language is a primary example that we find here.

Maggy Benson: L.O.L.

Joshua A. Bell: Yeah, exactly. So, apps are changing how people interact, people's notions of privacy, we find [00:21:30] mobile money in places that don't have easy access to banking, such as parts of Africa, and the Caribbean. So, this is transforming how people interact. There are now new apps that allow doctors to actually diagnose things through the smart phone camera, etc. So, what we find is it's making up for infrastructures. But, at the same time, it's amplifying already existing cultural trends, that we find in different societies, i.e., the need to communicate, the importance of kinship. [00:22:00] While, at the same time challenging kinship in different ways. So, it varies. Clearly, the verdicts not out about how it's transforming it, I would argue it is, the question is, is it a hard transformation, or complete? Or, is it more of a weak one?

Maggy Benson: So, you're a scientist, you're a cultural anthropologist, you have the tools to be able to study how our cultures are being impacted by the cellphone, what's in the future for your research?

Joshua A. Bell: Yeah, so with colleagues, that I mentioned before at George Washington University, we're going to be looking, shifting, building on the work that we've [00:22:30] done with teenagers to date, (using) The little survey that we've done, and to look at families. And, so basically for three years, we're going to track the impact of technology with teenagers, both in terms of their school. What they can and cannot do at school? But also at home, how is it impacting how they interact with their parents? What are the intergenerational tensions? And so, hopefully through doing the ethnography, actually show people what's actually happening on the ground. Who are they talking to? How is this affecting their perceptions of themselves, their [00:23:00] language use? And how do these things, when they don't work, how does it affect them? Is it a source of panic, when they lose it? Et cetera.

Maggy Benson: I saw that image on the screen there, of the family sitting around the dinner table all on their own phones.

Joshua A. Bell: Right.

Maggy Benson: And you hear that texting is ruining families today, is that something you're going to be looking at?

Joshua A. Bell: We will, and the thing, what you don't know, of course, with images like this, that you see like, such as that image, and then in the press, is actually who are these people [00:23:30] talking to? Right? They might all be talking to each other, and they may be playing some game. So, they may be connecting in, a different way, that's not face to face. They may be connecting with their relatives that are in a different location. So, I think the issue is, again, unpacking what's going on. How is this impacting people's notions of each other? Etc.

Maggy Benson: So, what's in store for the futures of cellphone, of the cellphone? I don't think they're going anywhere anytime soon.

Joshua A. Bell: Yeah, I think cellphone technology is just going to keep rapidly changing, and changing, [00:24:00] and we're already seeing some, of the new trends, with Google glass, and the new wearable wrist watches, etc. and things like that. I think we're going to see more of that. Google has come out with a prototype that they're gonna, I don't know, launch when, but which will basically imbed fabric. So, we'll have smart fabrics, which will allow us to connect to smart phones that way.

Maggy Benson: That might be dangerous for me, I'm known to spill on myself.

Joshua A. Bell: Right, exactly, more chance for repair. I think looking, 30, 40, 50 [00:24:30] years out, this is where science fiction, I think is actually useful, and this is where implants could be a possibility such that you actually have something connected to your head.

Maggy Benson: Wow, that's fascinating. Maybe in a couple of years, we'll look back at this webcast and say that Dr. Bell, the really knew where cellphones were headed.

Joshua A. Bell: Or, I was completely wrong. It could be interesting, in finding out.

Maggy Benson: Time will tell.

Joshua A. Bell: Yeah, exactly.

Maggy Benson: So Josh, do you have any recommendations to myself, to our viewers today, about what to do when your cellphone does break? What if the screen cracks, what if it doesn't charge [00:25:00] anymore? Should I upgrade if I'm up for an upgrade, or should I throw it away, what should I do?

Joshua A. Bell: Yeah, I mean, that's an individual choice. I would think that what one needs to do, as with all the things we consume, you have to think about do you need that new thing? So, if it's a matter of, "Oh, I can get this screen fixed." And actually the phone is totally operable, I would push people to think about repair. If one needs to get the latest device because of whatever, then you need to do that. Then it's [00:25:30] a question of how you ethically can dispose of your phone, so is it recycling? Is it secondary market? Et cetera. So, people just need to be really aware and conscious that their choices technological and otherwise, actually have an impact that you may not see in your immediate neighborhood. But, is a global thing.

Maggy Benson: So Josh, I'd be really interested after learning all this stuff about cellphones to see if our audience has any different opinion about repairing their cellphone.

Joshua A. Bell: That would be great, let's do it.

Maggy Benson: All right. [00:26:00] Audience, we're asking you again, would you ever have a cellphone repaired? Yes, or no? Knowing what you know now, we want to see if your attitude has changed?

Maggy Benson: [00:26:30] So Josh, 69 percent of our viewers would repair their cellphones, but you know that's probably better than the current rate of people who are having their cellphone repaired today.

Joshua A. Bell: Yeah. I mean I think what's going to happen, is people, as it becomes easier, and this is actually where manufacturing and industry needs to make cellphones more repairable. But people also just need to be more aware of it, as a possibility. [00:27:00] So, that's great, to see that more people are thinking about it after our thing.

Maggy Benson: Josh, thank you so much for being here today and helping us understand more about the cellphone, and how it really connects us globally to people around the world.

Joshua A. Bell: Yeah, no, it's my pleasure, and I think this is again, one of the wonders of cultural anthropology, one that you can actually study anything. Cellphones, et cetera. But, I hope that this project, if it does nothing else, is to get people to realize how we are connected globally, [00:27:30] in various seen and unseen ways.

Maggy Benson: Great. So a very astute observation from R. Morari, are you related to Alexander Bell? Or, is it just a coincidence that you share the same last name?

Joshua A. Bell: Yeah, it is just a coincidence, but it makes working on cellphones interesting, so that's a great question.

Maggy Benson: We are unfortunately, all out of time. Thank you so much for sharing all of this wonderful information about cellphone use, and how our cultures are changing because of them.

Joshua A. Bell: Thank you for having me.

Maggy Benson: Can you tell our viewers [00:28:00] where they can learn a little bit more about his kind of work?

Joshua A. Bell: Right, so at the bottom of your screen you're going to find a link to the Q&A page, which has a list of resources about cellphones, about the minerals that go in cellphones. Besides that, if you're interested in repair, I would recommend [ifixit.org](http://ifixit.org). We're also developing a website as part of our own project's ongoing work, which we're going to make available to viewers, as soon as it's done. Hopefully, in July.

Maggy Benson: Awesome, thank you so much.

Joshua A. Bell: Thank you.

Maggy Benson: And thank all of you for all of your awesome questions, and [00:28:30] for joining us for another episode of Smithsonian Science How? If you missed this broadcast, it will be archived later this evening, at [qrius.si.edu](http://qrius.si.edu).