

# Video Transcript: Webinar – Human Origins Research in the Time of COVID-19

**Air date: September 30, 2021**

**Briana Pobiner:**

All right. Hi everyone. It is just about 11:30, so we're going to get started. My name is Briana Pobiner, and I'm a paleoanthropologist and educator in the Smithsonian Human Origins Program, and I'm your host for today's HOT topic program. Welcome to this event, Human Origins Research in the Time of COVID-19. This is part of our HOT topic program series, which stands for Human Origins Today, and we hold these programs once a month. I will mention next month's program in a moment. This presentation is being recorded and will be posted online within a few weeks. If you're interested in turning on the closed captions, there is live closed captioning. You can look at the bottom or top of your screen to that CC button, and you can click that, and you'll be able to see live closed captions. This program is happening in a webinar format.

We can't see you or hear you, but you can post questions during the event using the Q&A button, which is that button on the bottom or top of your screen with two speech bubbles that says Q&A. So I'll just go over the structure of the program. After this introduction, I'm going to turn off my microphone and video, our program speaker, Rick Potts, will come on screen, and he will give a presentation for about half the time of our hour long program, and then I will come back on screen and I will ask Rick some of the questions that you've posted in the Q&A. During the presentation, I will also write answers to some of your questions in the Q&A, at least any that I can answer, and we also have with us behind the scenes today human origins program postdoctoral fellow Dr. Grace Veach [00:01:45], who will also be helping to answer some of your questions.

Next month, if you're interested in signing up and tuning in, our HOT topic program will be on October 21st at 11:30 AM, and it will feature Dr. Marc Kissel from Appalachian State University talking about the evolution of human warfare and peacefare [00:02:07]. So I'm going to introduce Dr. Potts now. So paleoanthropologist Dr. Rick Potts heads the Smithsonian's Human Origins Program and holds the Peter Buck Chair in Human Origins at the National Museum of Natural History. Since joining the Smithsonian in 1985, Rick has dedicated his research to piecing together the record of earth's environmental change and human adaptation. His ideas on how human evolution responded to environmental instability have stimulated wide attention and new research in several scientific fields. Rick has developed international collaborations among scientists interested in the ecological aspects of human evolution.

He leads excavations at early human sites in the East African Rift Valley, including the famous hand ax site of Olorgesailie, Kenya, and Kanam near Lake Victoria, Kenya. Rick also leads the team that recovered the first long sediment core drilled from an early human site in East Africa. This core preserves a high-resolution archive of environmental dynamics over the past 1 million years. He has also co-directed projects in southern and northern China that compare evidence of early human behavior and environments from East Africa to East Asia. Rick received his Ph.D. in biological anthropology from

Harvard University in 1982, after which he taught anthropology at Yale University and served as curator of physical anthropology at the Yale Peabody Museum.

**Briana Pobiner:**

Rick is curator of the Hall of Human Origins at the Smithsonian's National Museum of Natural History, and of the traveling exhibition, Exploring Human Origins, leading a Smithsonian team touring the US with the exhibition. Rick also co-authored the permanent exhibition companion book, What Does It Mean To Be Human. And when he's not time-traveling in the East African Rift Valley and elsewhere, Rick enjoys singing, Halloween, and the Phillies [00:03:57]. So I would like to invite Rick to turn on his camera, and he will share his screen and start his presentation. So thanks so much for being here, Rick. Oh, we are not hearing your audio. It looks like you're off mute, but we still can't hear you. Nope, not yet.

**Rick Potts:**

You cannot hear me now?

**Briana Pobiner:**

Now we can hear you. Fantastic.

**Rick Potts:**

Okay. Can you hear me well?

**Briana Pobiner:**

Yes. Thanks.

**Rick Potts:**

Okay. Very good. Thank you, Briana, for the introduction. I didn't think the Phillies would be brought up in the introduction, but so be it. And much appreciation to you, the audience. Really pleased to be with you, and we're very happy and grateful for you being here with us today. Our work in the Human Origins Program is to study human ancestry, especially the species that came before our own species, to study those ancient ways of life and adaptations that those species had to their surroundings. As you may well know, *Homo sapiens*, which is the name of our species, is a very young species relatively speaking. We first appear in the fossil record about 300,000 years ago, and what came before us is wonderful, it's fascinating, and it requires discovering evidence, not only fossils of earlier species, but also evidence of their ways of life and the places and habitats in which they lived.

And so in order to do this, the work of anthropologists and paleontologists requires going places. Our field work requires traveling to other countries, and the place where my research team and I have worked for a very long time is Kenya, a country in the eastern part of Africa. And Africa is the continent with the oldest and longest record where the immediate ancestors and relatives of our species evolved. I've spent over four decades doing work in Eastern Africa, and our studies in Kenya over the years have led to a whole slew of questions that we wish to answer, and that's why we go there every year, until the summer of 2020 and the summer of this year. And so what this slide shows is research sites of our work at the Smithsonian in the study of human origins, and you can see some areas of Eastern Asia in

China, Indonesia. Briana has laboratory work and collaborators in Europe and Romania, but you can see that a lot of our work is so focused on Eastern Africa.

**Rick Potts:**

The reason Africa has been the focus of our digs and other field studies is that a lot happened there over the past 6 million years. And you see a timeline on the left side here of the slide of 6 million years, the period of human evolution. And this is just going to be a review just to get us all on the same page. This slide shows how earlier species can be grouped together. And all of these species represented by these circles possessed some of the traits that make humans unique as a species today. There are about, according to different researchers, 20 to 25 different species in our evolutionary tree, all of them, including ourselves, are as a group called hominins, and the spelling of the word hominin is at the top of the slide.

And they all had upright bodies, they all walked on two legs, the adult females and males had small canine teeth that were roughly the same size, and that's different from other primates, which is the biological group to which we human beings belong. And in the other species of primates, the males have larger canine teeth than the females, and they don't walk upright generally. They can on occasion, but generally they do not. And so a whole variety of things that distinguish our evolutionary tree from those other primates, and various traits have changed over time. You all know about the evolution of larger brains, but in some of these lineages or species, sometimes they developed smaller brains. Some species had larger teeth and faces, others smaller teeth and faces. And so the different appearances seen in the fossils, seen in the fossil record are how we can identify different branches of the tree, different species, and the groupings of species. Much of what occurred is an African story.

And even our own species, *Homo sapiens*, first arose in Africa. The genomes of all people on earth today indicate our shared African origin. And so back to our main topic for today, virtual field work in Kenya. And the maps at the top of the slide show on the left where Kenya is situated in Africa, and on the right, just to remind me to say that I'll be speaking about two main areas where we did virtual field work. One is in the southern part of the country of Kenya called Olorgesailie, the Olorgesailie region where we have done work for many, many years, and then the second place I'll briefly mention is the Homa Peninsula near Lake Victoria. That's what that blue is, the big blue with the largest lake in Africa, Lake Victoria, and the Homa Peninsula is right on the shores of that lake. And so I thought I'd take you through the various steps toward virtual field work in Kenya, at least what we did and what we came up with.

And first of all, we had to arrange for a Kenyan field team, a team of expert excavators who have worked with us for the past decades, we had to arrange for them to travel and to travel safely from Nairobi, which is the capital of Kenya, to our field sites. Weeks ahead of time, we decided on a research plan, a schedule, and a budget. It takes money to run these things. Get the funds in place in Kenya with agreement on how accounting has to be done by Smithsonian rules and everyone else's sense of responsibility, big responsibility with regard to this, and it has to be done right.

We arranged to have a phone call every day. The team was in the field, and they would send me photos of their daily activities and a report, an email usually, and we would discuss that every afternoon for me, evening for them. There was a seven hour time difference in time zones. And then the writing of field reports. And that allows us to make a research plan for next time that we'll see each other in the field.

**Rick Potts:**

And so the first stop in our virtual field work is Olorgesailie, Southern Kenya. It's an area of East Africa, Eastern Africa called the Rift valley, a large area that is fantastic for the burial of fossils, habitats where the fossil animals once lived. Not the fossil animals, before they were fossils, where they lived, as well as the early humans. And a great place for them to become buried, and then due to changes in the landscape, the landscape uplifted and eroded so that we can actually find where they were. So we have found fossil animals such as is this extinct form of zebra seen on the left, extinct form of elephant, the large lower jaw you can see in the middle, and we also have some bits and pieces of the fossil hominins themselves. The top most one called *Homo erectus*, 900,000 years old, was found at a cranium site.

This is the cranium. The eye sockets are looking toward us, and so we just have the top of the skull. And there's a lower jaw that we're describing right now that was found a few years ago, a lower jaw on the bottom of that grouping. And we also have lots and lots of stone tools. Tens of thousands of stone tools were left behind by the early humans at Olorgesailie. It's the most famous or one of the most famous sites in Africa for stone hand axes. And at Olorgesailie, those stone hand axes stretch back for more than 1 million years. You can see those stone hand axes on the left side, those oval and pointed shaped objects on the left side of that timeline of the stone tools, but we also have recorded something that's been really fascinating to us, the oldest evidence of a new technology, a different technology that replaced the hand ax technology, and it's what we call the middle stone age of Africa.

And at Olorgesailie, we've been able to document the oldest evidence of that replacement of technology and way of life. And the technology includes not only smaller and more carefully-made tools, but also evidence of the use of this black stone called obsidian, and the trading of this black stone from multiple directions over long distances. And we also have at the bottom there circled evidence of the use of pigments, of coloring material which archeologists generally see as the start of complex human symbolic activity. Think of all the ways we use color, not only in art, but in body adornment and clothing and so on.

So our main research goal, just very briefly, at Olorgesailie is to try to understand through our research how early hominins, how hominins adjusted to environmental change and multiple changes over the past 1 million years of time represented in this site. And that has led us to dig hundreds of fossils and archeological excavations representing that whole period of time. And so here is what the era area looks like, eroded hills, slopes and gullies you can see especially in the foreground there, but stretching out across the landscape. You can see layers of dirt or sediment, as we call it. Each of those layers reflects a change, often some subtle change, but sometimes a very dramatic change in environment. Some of these layers are volcanic ashes that volcanoes exploded nearby and dropping ash into this area, and those volcanic ash layers each contain minerals made up of radioactive elements that allow our scientific team to compute and establish the age of each of the layers.

Let me also point out here our campsite. We didn't have the campsite last year and this year, but that's where we usually would set up our camp whenever I'm there over the years, tremendous place to live and work. And also in the distance is a site museum, the National Museums of Kenya, our major partner in Kenya overseas. And it's the site museum that made it urgent for us to have our Kenyan field team go to Olorgesailie this summer. Here is a view of that site museum right at the place. It's a place where visitors and many, many school children go to visit to look at the displays that we have set up. There is

also a walking trail that leads you through some of the excavations that the famed team Louis and Mary Leaky excavated going way back to the 1940s, and also a famous archeologist named Glen Isaac did excavations here in the early 1960s.

**Rick Potts:**

And on the top view, just beyond those two buildings on the right where people can stay overnight, just beyond those two we have a storage area for our stone tool collections, and those stone tool collections are the things that we like to study when we're in the field. And in March, the roof of that building blew off in a rainstorm, in a windstorm. And we sent a crew down there of three of our team who volunteered to go down there to make some immediate repairs, but in July of this year, we had an expert team of carpenters and masons and others working to rebuild the shelter, put a new roof on. Everything had to be moved out, including all of the collections. Moving out those collections allowed one of our key members of our group, Sylvester Musyoka, who works at the National Museums of Kenya, to replace any of the bags and information that had begun to be damaged. And so he did a wonderful job doing that when we had to put in a new floor.

And this is Muthiani Makuu, who's our expert in laying that floor. And then all of the trays of specimens were put back into the building and covered over. And this is the great result, the green building in the back with the team that I owe a tremendous degree of thanks to who rebuilt the shelter, Mbuvi Mutokaa, Muthiani Makuu. Let's see who else is there. Sila Enzebo[ 00:19:53], Sylvester Musembi Musyoka, Muthengi Kioko and the photographer, who's not in the picture, taking the photograph is Joshua Nzioki Mativo, and Mativo is the foreman of our crew during our regular field seasons.

And so not only did they rebuild the building, but they also conducted a survey, a research survey. Ologesailie and our work there is a collaboration between the Smithsonian Human Origins Program and the National Museums of Kenya, and I thought I'd just take you through how the survey and the evaluation of the fossil sites that they went down there to assess, how that took place. It starts by walking across the landscape, walking, walking, walking, and looking with sharp eyes. Walking through that part of the landscape where there are eroded hillside and gullies where wind and water have eroded the layers of sediment and exposing layers where fossils and stone tools may be tumbling out of those layers. And here, Sylvester Musyoka and a local member of our crew, Kakai ole Mindo... Kakai has been working with us for about 25 years now.

They're on survey, and what they do is, they check on the status of the sites, the old sites where we have excavated, they see if there's anything eroding out that needs to be collected. They did collect a number of fossils and stone tools, artifacts. They took extensive notes. They took careful GPS coordinates of every place where a fossil or a stone tool was found. They took a sample of the sediment with each of the pieces that they collected, and they took a heck of a lot of photographs that document the collection place of each fossil that they got and brought back to Nairobi to the museum.

They collected only those objects that were at risk, that is in a place where a seasonal rainstorm could wash the piece away and be lost forever. So Kakai and Musembi reached one of our long term excavations, and this is a site where 1 million years ago, an elephant, an extinct form of elephant today, but was very prominent on the landscape 1 million years ago, but where an elephant died and was

butchered for food. We see cut marks, butchering remarks on the bones indicating that the stone tools that surrounded this large elephant was butchered for meat.

**Rick Potts:**

Also here's Nzioki Mativo. He's made a fossil discovery, always a happy thing, and Mativo is a joyful person anyway, wonderful to work with. This is just a selection of some of the finds that they made. You may recall that earlier in the presentation I pointed to a hominin fossil, a skull, a cranium that had been found, well, this is the hominin cranium site that they revisited, and they last year and this year found four interesting pieces that they collected and want me to look at and to see whether they may be more of the skeleton of that particular early human. That's on the upper left, where the guys are pointing different places where they made the collection. On the upper right selection of finds, these are fossil teeth of a crocodile in the middle that's 615,000 years old, and also a tooth of a zebra that's about 1 million years old. Lower right, a suid. What do you think a suid means?

Well, suids is the biological group pigs and ancient wild pigs, and this is a fragment of a molar that's a most interesting one in terms of its age, maybe one of the last known of its kind in Eastern Africa, and can't wait to get there to look at that. And then in terms of sites where we previously excavated, this is a site, you can barely make it out, but a trench where a 609,000 year old hippopotamus, an extinct form of hippopotamus was excavated, and they found that the site began to erode, and they put rocks, cobbles in that little erosion area and built up kind of a wall to protect the site from further erosion.

Let me just take you through an example of finding a fossil and what we learned. Erosion since last year, due to rain and wind, allows a member of our team, Kakai, to spot an interesting tooth, and it is a fossil tooth of an elephant. And so the question is... And there's the tooth as he first found it on the left, along with the scale for photography that he and Sylvester put down there to take the photograph. And you can see that the fossil is just being exposed, just eroding out from being embedded in the layer of sediment, but what kind of species of elephant is it? What species? And so we have this species of elephant that I mentioned earlier at that butchery site that's well-known. It has the name *Elephas recki*, is the name of that species.

And there's the lower jaw of it, again, on the right. And you can compare the molars, and they actually look a little different from one another, and it turns out that *Elephas*, the extinct form of elephant in Africa, it still lives. That form of elephant still lives, or a descendant of it still lives in Asia. But *Elephas* has these plates that are very, very closely packed together. And perhaps you can see those tooth plates labeled C and D on the right side under *Elephas*. And as the tooth is eroded as the animal chews during its lifetime, those plates maintain that distance all the way down, whereas the modern day African elephant is *Loxodonta*, and it has different-looking tooth plates, again, as you can see with C and D on the left side under *Loxodonta*. And as the tooth erodes, the areas become wider and wider and wider.

And so this is a photo that Sylvester, when he got back to the museum, sent me, and it looks like that fossil tooth that Kakai found is quite closely matched by the modern African elephant known as *Loxodonta africana*, and it's not a lower molar tooth, but rather an upper. And so that's really exciting. Why is that interesting to us? Well, elephants, they eat a lot of plants, and they are often referred to as ecosystem engineers. And what ecosystem engineers are, is that they are species that change the environment and the vegetation to such a degree by eating plants on a large scale, and they create

changes in what other plant-eating species, of antelopes and pigs and zebras and rhinoceroses, and hippopotamuses, what species can thrive in that same area.

**Rick Potts:**

Well, it turns out that *Elephas* was a specialized grazing animal. It could eat grass, and it ate a lot of grass, whereas the modern day elephant, *Loxodonta*, tends to eat leaves from trees rather than grass. It eats leaves from trees and low line shrubs. And so this transition from one form of elephant to another form of elephant very early on by about 500,000 years ago in Southern Kenya is really, really interesting ecologically and tells us something important was going on in the environment in which early humans were living.

This is a place where the team also visited. This is actually a photo from 2004, and it's the oldest stone hand ax site at Olorgesailie dated to about 1.2 million years ago. And you can see visitors are there to look inside of the excavation pit, and I'm there standing on that little bulk area, right on the edge, right behind the little river channel explaining this site to the former director of our museum, the National Museum of Natural History, Christian Samper. And we covered over the site so that we could then uncover it again to show to visitors because it's an interesting and important site. Well, when the Kenyan team visited it this summer, here's what they found. This is a photo from the opposite view, and that bulk area where we were standing right next to the river has completely collapsed.

And so what the team did, was that they found that the artifacts themselves were not eroded away, but they built up a wall. You can see the beginning of a wall of big stones to prevent further erosion. And it looks quite solid, and I think we'll do a great job at protecting that site and the antiquities, the stone artifacts that are in that excavation.

I'd like to very briefly mention another fossil site near Olorgesailie. This is called Nyokie, the Nyokie fossil site. You can see in the map that it is south of Olorgesailie. That big green and yellow top blob underneath the word Olorgesailie is Mount Olorgesailie, so it's south of that. And Nyokie is a flat plain, but man, what amazing fossil treasures slide beneath that plain. There was earthquake activity that went on about a half a million years ago, 500,000 years ago that is, and animals fell into the cracks that developed along where the ground separated during the earthquakes, and bones were washed in. And so we have a really, really neat snapshot of an ancient fossil ecosystem 500 to 400,000 years ago, which was a very important time of change in early human evolution. And so you can see some of the bones that we found in some of those cracks as we went down through that plane. On the lower left, I just want to emphasize that at Olorgesailie and Nyokie, and at the other sites that we excavated that we visited this summer, we wanted to pay research fees to the landowners.

We always do this every year. And even though we were not excavating this year, we were only surveying, we wanted to continue our partnership with them, and it was very, very important. And Mativo, who is seen as the masked person on the right, thought to bring hundreds of surgical masks for the community to help keep them safe. And so that was a really thoughtful thing to do. Our relationship with the communities, the Maasai communities of the Southern Kenya rift is really important to us. That relationship... And these are all photos not from this year, but from other years, involve showing school children and adults our excavations.

**Rick Potts:**

In the upper right, I always bring leaders from the Maasai communities, the local communities to Nairobi to see the fossils and stone tools that we've excavated each year and where the materials are kept for safekeeping for the country of Kenya, and in the lower right, even planning for a Maasai cultural heritage museum that we're trying to help out on and have them built. So this relationship is really very important to us, and we were able to maintain it even during the time of COVID. After the field season at Olorgesailie was completed, the team went out to the west to the Homa Peninsula. Again, I'll just mention this very quickly. You can see where the Homa Peninsula is based, and you can see a satellite photo of some of the sites where we work. And I want to especially acknowledge Dr. Tom Plummer, who's at City University of New York in Queens in New York city, and Tom is the co-director of the work on the Homa Peninsula with me and has really taken charge of many of the excavations, most of the excavations over the course of the last several decades.

At a place called Kanjera South, our team's excavations led by Tom has made some pretty interesting discoveries, oldest evidence of early humans occupying a 100 percent grassland environment, also evidence of consistent or persistent meat-eating level after level with cut marks on the bones. This is 2 million years ago, this evidence comes from. And all this evidence of transporting stone, carrying stone or making stone tools over distances of up to about eight miles, which is a pretty long distance for that long ago, 2 million years ago.

In addition, that upper left slide, this next slide will come from Nyayanga on the western tip of the Homa Peninsula. In Nyayanga, Tom has made some tremendous discoveries that we're still working on publications on this, but it looks like it's older than 2 million years ago, and maybe even older than two and a half million years ago. I'm not exactly at liberty to say exactly what we think the age is, but there's large animal butchery sites that occur there, there's very early stone technology, and also early fossils of an evolutionary cousin of ours known as Paranthropus. And when the team went there to look at the sites, what they were able to find is that the sites are still well protected, covered over, the places where Tom has been doing ongoing excavations, and this is just two of the sites where you can see an outline where basically the excavations have not been bothered by erosion.

So that was very important. So just like in the other places, it begins by walking around on the Homa Peninsula. This is the upper jaw, the pallet of a suid. Again, wild pig from Nyayanga. This is kind of a test. See if you can locate the fossil in this test, but walking along, this is what you have to keep your eyes out for. Perhaps the audience has already spotted it. And time's up. And there it is, and it's a couple of monkey teeth embedded in the jaw. And this is kind of interesting.

It looks like it's a form of monkey that may be older than two and a half million years old, so that'll be really interesting for us to inspect when we get a chance to go back to Kenya. And again, I want to acknowledge the team in the time of COVID, Mativo on the left, Blasto Onyango, who grew up locally in Western Kenya has worked for many years with the National Museums of Kenya and is part of our crew, Muthengi and Sylvester you've met already, and then on the right side, Benard Mukilia [00:37:03], who's the assistant foreman of our team during our regular field seasons.



**Rick Potts:**

Finally, I do want to mention that while conducting field work at a distance is really exciting, it was more exciting than I imagined, getting that phone call every day and talking about what the finds were was really interesting, but besides that, there were other things to do during the pandemic. Our teams were busy writing and publishing papers based on our previous field work. One example is, and Briana mentioned this in the introduction, our drilling project at Olorgesailie, and that red dot shows the drill core sites.

I never thought as a paleoanthropologist I would do this kind of work, but it was interesting to get the first drill cores out from an East African early human site. It's in a area called Koora, just south of Olorgesailie. And these just shows some photos of the drill rig in the distance with the south side of Mount Olorgesailie in the distance, and then a closer view of the drill rig, which as it drills down, it brings up a cylinder of sediment that's a about three meters in length and does this over and over again until it reached 166 meters underneath the ground hitting the basement, on the bottom volcanic rock of the Rift Valley in this area.

And these cylinders of sediment, what's known as the drill core, stretches back 1 million years of time. And each segment of this core was split in half, and you can see that on the right side. And in October of 2020, we were able to publish, even during the pandemic, in the journal Science Advances, this paper that you can see here on our synthesis of the drill core work of many environmental records, putting the contributions together from many, many colleagues, as you can see all the authors there contributing to our Smithsonian-based project.

But I also want to note that in 2021, three of the recent Ph.D.s, people who recently got their Ph.D.s, have publications or manuscripts that have been accepted for publication. And I'm very excited about this, because these are the young members of our team, Rahab Kinyanjui, Veronica Muiruri, and Rachel Lupien. Rahab and Veronica work for the National Museums of Kenya, and Rachel Lupien got her Ph.D. at Brown University in the United States and is working at Columbia University, Lamont-Doherty Earth Observatory in New York. And so I just wanted to conclude then by showing you a photo of Rahab, who's there in the back on the left. She is a very special member of our team, is with me Co-PI, co-principal investigator on the Kenya side of our research, and this is a image of the paper that's been accepted of her work on these little tiny silica particles called phytoliths, which are made by plants, plant roots, plant leaves, plant stems, blossoms and so on, that tell us the nature of the vegetation through time over the last 1 million years.

And so this is a really neat approach that Rahab takes to understanding ancient vegetation and ecological changes. And the gentleman in the front part of that photo on the left is Mr. Francis Ndiritu Muchemi, who has been working with our field team for a couple of years, and he is now at Georgia State University, and we're supporting his Ph.D. research there. And you can see both Francis and Rahab sampling part of the drill core. So in conclusion, in our virtual field seasons, our team collected about 50 fossils and stone artifacts that would have otherwise have been lost in the next rainy season. They documented several new archeological and fossil sites. Overall, our excavation areas are in very good shape, but we had to be sure of that, and the team was able to bolster and protect some of the at-risk sites.

**Rick Potts:**

Through their work, we were able to stay in touch with the communities, the local peoples who have been tremendous partners over the years. Our collections building was successfully repaired, which is a relief. And that repair allows our continuing care of the tens of thousands of stone tools that are kept at Olorgesailie for study in the field. Two reports were written, each about 25 pages long. Those reports carefully document the research that went on. And I've got to say, it was amazing and fun to find a way to do international field research during the pandemic with an enormous amount of help from our friends and international collaborators, but one of our top priorities was also fulfilled, and I have to mention that, in that everyone took tremendous precautions, international and Kenyan ministry of health precautions, and stayed safe and is healthy.

We have a terrific research partner in the National Museums of Kenya, and we at the Smithsonian will continue our best to assist them and the local peoples where we conduct research, and all I can say is, we certainly look forward to seeing them next year. And so I thank you for that quick run-through of our pandemic field season, and I'm very much looking forward to taking your questions. Thank you.

**Briana Pobiner:**

All right. Thank you, Rick. That was a great overview. We do have a couple of questions that came in, and in fact, I will start with one that I think follows very well along on your last comment. So Dan... I know the person who's asking this. Dan asks, based on what you know at this point, do you anticipate doing similar virtual work in Kenya next year?

**Rick Potts:**

Yeah, it's a good question. Much depends on the uncertainty of the virus and its mutations. I'm a biological anthropologist as well, and so I understand what that can mean in terms of the epidemic. We all have been in that uncertainty and all have had tremendous challenges, and I want to acknowledge that. Now, while we've been able to kind of scratch our heads and figure a way to continue on that, a lot of people feel very stuck and delayed in their hopes, ambitions, goals. And so we hope to get back there next May to do lab work and also field work, but we'll have to wait and see. If we can't get back there, we'll certainly do another virtual field season.

**Briana Pobiner:**

Great. Thank you. Question that came that follows on this, but actually before that, I just want to mention that I'm really excited as a panelist I can see who's attending the presentation, and I just want to give a big hello to Rahab and Musembi, who are both in the audience today. So Bess asks what's the criteria for you to return to the field? And also says, This was fascinating. Thank you.

**Rick Potts:**

What are the criteria for returning to the field?

**Briana Pobiner:**

Correct.

**Rick Potts:**

Safety, safety, safety. First of all, the safety of our fellow Kenyans, of our Kenyan colleagues is utmost important. That's the first thing. And all Kenyans face a hurdle in that regard, as do people in all other countries and in their own countries. And so we don't want to go there with the idea that when we go there, we bring dozens of people together, and we don't want that to happen if there's any sense that it's not safe for Kenyans within Kenya. And then permission by the Smithsonian. The Smithsonian, just as it's a museum, least it's a natural history museum, our museum, is opening very cautiously and slowly, which is a good thing, that the permission for international travel also needs to proceed very, very carefully, and so we of course must obey by those guidelines. So it's the combination of the two things that's important.

**Briana Pobiner:**

Absolutely. Another question similar on this vein that just came in, Connie asks, are the Kenyans able to be vaccinated? Do you happen to know if members of our crew have been vaccinated?

**Rick Potts:**

Yeah, that's a good question. When the members of the crew went there, I think all of them had their first vaccination of the two part vaccine. The one that commonly also took place in England was available in Kenya. The vaccine is becoming far more available, but it's not available enough, according to a couple months ago, according to the demand by Kenyans. Kenyans want the vaccine. What's so interesting to me, is that in the rural communities, the communities, for example, at Nyokie, the Nyokie fossil site, the Nyokie group ranch and the whole community there was getting vaccinated due to the schools that they have developed there for Maasai High School girls, as well as their primary school. And those are actually featured in one of my slides looking into our excavations, that the Nyokie community, while it may seem very remote to Kenyans, is well-known in the international community, and it has therefore been able to negotiate getting vaccines from Europe early, donated by the international community. So everyone there was vaccinated, but they still want to wear masks, and I'm glad that surgical masks were brought there for them.

**Briana Pobiner:**

That's excellent. We have two questions that are similar that, I'll ask one first, and then the other after you've answered the first one, just about kind of the virtual field work process and the future of that. So Lynn asks, could a hybrid in-person and virtual approach to field work allow for an increased number of sites to be explored in the future?

**Rick Potts:**

That's an interesting idea. I hadn't thought about that, Lynn, and so I appreciate that comment. Yeah, it could. It could certainly allow also for a larger number of students and scientists, and also perhaps public education programs. And Briana's often there with our team out in the field, always there with our laboratory team as well working in Nairobi, and so we'll have to think about that, expanding the number of experts and students, including students and expert citizen scientists who wish to be part of the project. But in terms of extra sites, could be. It could allow us to expand our looking at sites within the regions where we have our permits, our Kenyan government permits to work, which is in Southern Kenya Rift Valley, where I've shown you, and also on the Homa Peninsula in Western.

**Briana Pobiner:**

Yeah. That is a really interesting idea. So a question from an anonymous attendee along a similar lines. Now that the process is in place, could the virtual field work process be used to inform stakeholders and potential stakeholders, students, et cetera, bringing individuals from around the world who may not have had the resources to visit in-person to see this work?

**Rick Potts:**

Yeah. Yeah. I think in fact that's very much related to the last question, and sparking in my mind the idea of having some education programs. And paleoanthropology and the study of human origins is the study relevant to everyone. We're all stakeholders, and we're all human, and be able to understand some of the steps in the process and the conditions surrounding the emergence of our own species on the planet, we're all stakeholders, so I love that idea of using that term and making education programs available to everyone through this means. So Briana, we'll have to brainstorm after this about how we should do this in the future.

**Briana Pobiner:**

Definitely. I'm thinking about it already. Here's a question from Audrey. Do you have any cameras operating on-site to monitor the sites and view natural or human interventions during this time? And also she says, thank you for a great talk.

**Rick Potts:**

Thank you. We do not have any cameras in place. We don't wish to do that. We have eyes, many, many eyes of our local partners. At the site museum, for example, the National Museums of Kenya has hired about four to six people at any given time to be guides for people who visit the site museum and the walking trail, and they are... In fact, the alert in March that the roof had been blown off the building got to me within a few hours, because the head guide at Olorgesailie site museum phoned Mativo, who phoned Sylvester Musembi, who got in touch with me, and we were able to arrange within a couple of days people going down there to fix the roof, make a temporary repair. But no, we have actually a lot of local members of our team and people who we have hired over the years who are very eager to protect the sites. They know now what's underneath the ground, and they're better than cameras for capturing anything that might be going on.

**Briana Pobiner:**

Yeah, that's great. And it just goes to strengthen the of relationships with the communities there too, I think. Here's a camera-related question from Niels [00:52:37] who asks, what kinds of scientific imaging are done at the site? Do you have more than regular camera images to study recent discoveries?

**Rick Potts:**

No, we mainly use our own regular high-fidelity, high-resolution cameras, not just our phones. And so we do this all the time. And in fact, we were able to provide a really, really excellent camera for Sylvester to take photos and for Mativo to take photos of everything they found. When they would find something, they would take a close-up of its exact location, a finger pointing to the exact layer, and then would move further away so that we could take the big view with the person still pointing at where the fossil or stone tool came from. With regard to other imaging, we use a lot of Google Earth, frankly, with satellite imaging. And actually, Google Earth uses the satellite photographs that we commissioned about 15 years ago. We wanted to get new satellite photos flown, and we commissioned that to be done, and

Google earth thought, wow, this is really good, and they used it on Google earth. And then we also have aerial photography that was flown by a Kenyan company that's also very useful.

**Briana Pobiner:**

Nice. So yeah, all kinds of images that we can potentially use for the field work. Here's an interesting question from E. Washburn. Are there areas for field work that you feel are under more threat due to climate change? Are these areas you are able to prioritize with partners?

**Rick Potts:**

Yeah, that's a really good question. The areas with regard to climate change that would be most in threat are archeological sites on the Kenyan coast. You could see from the map that Kenya has a coast along Indian ocean, and any archeological sites there. Most of the sites that are known are sites that are much later in time, they're very interesting for late prehistory of Kenya and more historical kinds of monuments and sites, and those really are, there's going to have to be a lot of thought about how to protect those places. All of our sites are inland, but one of them is on, as you could see, that large area, the Homa Peninsula is on Lake Victoria, and whether climate change may increase, because it's such a large lake, may increase the frequency of storms.

**Rick Potts:**

Many days that when we're in the field, thunderstorms come rolling off the lake, and we have to kind of close up shop, cover everything over in the middle of our excavation and leave for the day, and then come back in the morning and uncover and continue. So it could be that the threat of further storms, of more intense storms rolling off the lake could be a factor. And then the dry areas of Kenya will be affected by climate change. It's not just all about wet, it's also that climate change will increase the drought in certain parts of Africa, and that includes in Northern parts of Kenya. And sites there might be under some degree of threat, not due to erosion by rain, but erosion by wind could also be a very important factor.

**Briana Pobiner:**

Absolutely. Liz asks, are there resources saved by doing the work virtually that you would be excited to apply to other needs? As we all look to doing more virtual programming, it's helpful to think about the possible advantages.

**Rick Potts:**

Yeah, absolutely. Our budget for the virtual field season was about a quarter of what it is when we go there personally and put up our tented camp and have 12 or so, about a dozen researchers flying in from all over the world who we support, because they're coming to do work with us, and also hiring a local Kenyan crew that's about three times larger than the number of scientists and students from other places. And so all of that is expensive every year, and so the virtual means was about a quarter of the price for both areas that we did studies. So it's less expensive, we can save money and apply it to elsewhere, but at the same time, we need to study the material, and our geologists especially need to be able to look at the layers of sediment in utter detail.

**Rick Potts:**

I mean, there's nothing like getting down on your hands and knees and putting your face a few inches away from the sediment itself to see things that we cannot see otherwise. And so we've done a good

job, we feel, in training Kenyans, our Kenyan colleagues, the excavators to do things, but at the same time, it takes a scientific village to really figure out what's going on at these sites. So we need to be there, and there's not going to be any replacement for that.

**Briana Pobiner:**

Yeah, I agree. I think we have time for one more question before we do a little bit of a wrap-up. And so an anonymous attendee asked a question that you've sort of touched on a little bit before. Has there been any looting at yours or other nearby sites?

**Rick Potts:**

Has there been any looting at our sites or nearby sites? No. It's been surprisingly safe. There was an instance about 25 years ago when on our camp cliff at night, we would see some odd flashlight in the distance shining around, and we thought, what is going on over there. And we would see it on several nights in a row, and we went over there, we didn't find any evidence of anything, except it turned out that there is a local person, not an African Kenyan, but a colonial Kenyan, if I may put it that way, who just thought collecting things was his right and his privilege, when in fact it belongs as part of the antiquities of Kenya, and it's our responsibility to protect them.

**Rick Potts:**

And he passed away and had collected dozens of hand axes from that particular place on the landscape where we saw his flashlight. And so that was qualified as looting, but we able to recover them, and they're at least able to be used for education purposes at the National Museums of Kenya. So other than that, there hasn't been really any concern that we've had. Again, many eyes and ears of our local partners there that makes a big difference.

**Briana Pobiner:**

Excellent. And I'm actually going to squeeze one more question in that just came in from Louis. What do you think about the possibility to get 3D scanner images like digital data from the local sites in Africa, and to reproduce these pieces, fossils and stone tools with 3D printers in the USA, is that possible and useful?

**Rick Potts:**

Yeah, indeed it's very possible. And Briana maybe knows more about this than I do, in that at a footprint site in Northern Tanzania where you work, Briana, that our Smithsonian 3D digitization team with digitization cameras, 3D cameras, were able to capture the footprints and reproduce them. And so yes, that's quite possible. And I think that if we had a... For example, at that elephant butchery site that we excavated. That was a long time ago before there was any kind of 3D cameras and 3D digitization available to us. That would've been a fantastic site to apply that to and to reconstruct it. And so yeah, that would be very, very possible, but it would have to be a very important site and uniquely important site to be able to pick up the 3D data. Let me just finish by mentioning that we collect 3D coordinates on every object that we lift in excavation. We have a laser transit, what's called an EDM transit that records every object north, south in elevation above the sea level at Mombasa, and assign that to every object that's lifted in excavation. So we do very much treasure 3D data.

**Briana Pobiner:**

Absolutely. And the last thing I'll do as we wrap up, is I just want to plug for people who are interested in finding out more about the research at Olorgesailie in Western Kenya, as well at Kanjera, Kanam, you can find some links to those sites on our website, [humanorigins.si.edu](http://humanorigins.si.edu). And if you're interested in visualizing, looking at 3D collections of fossils and artifacts, we have a whole collection of those that are now hosted on the Smithsonian 3D digitization site, [3d.si.edu](http://3d.si.edu). So have fun exploring. It was great fun for me to get a little bit of a virtual visit to Olorgesailie, because I haven't been there in quite a while. And before we sign off, I just want to remind folks that our next hot topic will be on October 21st at 11:30 AM, and Dr. Marc Kissel will be talking about the evolution of human warfare and peacefare. So thank you everybody for coming. And a recording of this talk will be posted on the National Museum of Natural History website within a couple of weeks. Hope to see you next month. Thank you.

[Return to the web page for the video, Webinar: Human Origins Research in the Time of COVID-19.](#)