



Smithsonian

National Museum of Natural History

Oral History Interview with Zeray Alemseged

Conducted June 3, 2024

Transcript finalized February 27, 2025

Funded by the William J. Graham Fund

Contact Information

Briana Pobiner

Human Origins Program

Smithsonian Institution

Washington, D.C. 20560

<https://humanorigins.si.edu/contact>

Transcript

Preface

The following oral history transcript is the result of a recorded interview with Zeray Alemseged on June 3, 2024. The interview took place remotely on Zoom and was conducted by Maggie Lemere for the Human Origins Program and National Anthropological Archives, Smithsonian Institution. This interview is a part of the Smithsonian Paleoanthropology Research Oral Histories Project.

Zeray Alemseged has reviewed the transcript. Corrections and emendations appear below in brackets. This transcript has also been reviewed and edited for readability and accuracy by the Smithsonian Human Origins Program. The reader should bear in mind that they are reading a transcript of spoken, rather than written, prose.

Interview

MAGGIE LEMERE: Okay, so I am Maggie Lemere, and I'm with Zeray Alemseged. The date is Monday, June 3rd, 2024. We're meeting on Zoom. And today I'm really grateful that I have the opportunity to chat with Zeray for the Human Origins Research and Oral History Project being conducted by the Smithsonian National Museum of Natural History. We're really excited and interested in exploring Zeray's journey into human origins research, including understanding how you, Zeray, chose your path, what some of the critical inflection points were, how your personal context has informed the work that you do, and where you are in your journey today, what questions are most exciting to you, what you hope for the future of the field, the legacies that you're proud of building so far, knowing there's more to come.

So, we're really, really grateful to have you as part of this project. I would love to have you begin by actually introducing yourself and tell us a little bit about what it means to you to be a human origins researcher. And perhaps you can start telling us about what some of the critical questions and themes are that have been really motivating to you since the beginning of your career.

ZERAY ALEMSEGED: Yeah. Well, thanks for having me. My name is Zeray Alemseged, and I am a paleoanthropologist, which means that I study early humans in order to figure out how we became human once we separated from the chimpanzees sometime seven million years ago. I'm a professor at the University of Chicago, where I teach and conduct research. So really, my [primary goal] as a human origins scholar is to define what makes us human, and that definition has many aspects. We are not the first and the only people to ask this question. This question has [also] been approached from the religious point of view, the traditional point of view.

Each of us asks where we come from, where is my grandma [from], where is my great grandma [from], et cetera, et cetera. So, when we ask the question, "where do we come from," it's nothing but an extension in time of those very personal questions and [which] ultimately become a humanistic question. When you ask that question then, what you say is, "Okay, what makes us unique as a species?" We are humans, we are *Homo sapiens*. We know that we separated from the chimpanzees sometime seven million years ago, so what makes us unique? [We can] determine where we come from and what makes us human, only in relation and relative to other creatures that also are closely related.

When you ask that question, you learn that what makes us human is, first, that we walk on two legs. We're upright walkers. No other animal habitually does this type of locomotion, the type of movement on two legs, that we do. We are also adept at using stone tools and tools in general, from the primitive stone tools that emerged [over] three million years ago to the sophisticated tools that you and I are using to communicate today.

We also have this huge brain, exceptionally big brain relative to our body size, that not only has allowed us to become the sophisticated species that we are [in term of tools], but to become the symbolic species that we are. That [means], a creature that cares beyond the utilitarian aspects of life. We care about things that are not really needed in terms of utility. When you see other animals, they will fight to access food, to access mates, to access territory, et cetera, et cetera. But humans would [also] fight over a symbolic barren land that has no significance in terms of economics. But symbolically we care about things that we don't even see. Hence, the imaginations that we have for art, for music, for even beyond life, after life. The majority of people on earth are one way or another religious people, and what they do is they're imagining something after life, and I don't think there is any other animal that does that.

So, as a human origin scholar, my job is to determine and analyze the origins of those key human attributes, be it upright walking, be it the large brains, be it the emergence of stone tool use or the symbolic species that we are. And when you do that, you start to understand, indeed we humans are separate from other non-human primates, but also at the same time we share a lot of commonalities. So, it's not just that we study how different we are, but we also study how similar we are to those who are closely related to us.

MAGGIE LEMERE: Thank you for giving that overview. Well, I'm curious more for you, how did this become the main theme of your life's work? I think I read that you were always a very curious young person and kind of a lifelong learner, but I'm wondering if you can tell us a little bit more about how you discovered that this could be a career in a field and kind of how it evolved that this interest took hold of you.

ZERAY ALEMSEGED: The short answer as to how I got to what I do is really serendipity. I was not meant to be a paleoanthropologist, in my opinion. Growing up, as you say, I loved school, I loved biology, science, et cetera. I also grew up in the northern part of Ethiopia, a place called Axum, which has a history that goes back to 3,000, 4,000 years ago. So, these [ancient] monolithic obelisks that are 24, 33 meters high, were just walking distance from where I grew up. So, perhaps something at the back of my head may have been triggered when I was little. But I will be honest to tell you that, like any average student, child, in my days, I was taught to study medicine or engineering because I was good at school. So, there is no really a trajectory that I can go back and track and say, I am who I am today because I did XYZ.

In fact, it's a [draw] that decided what I have become [in some ways]. That is, since I liked science, I joined the science faculty for my undergrad after high school. When I joined the university, I studied geology, and geology is basically the study of earth, rocks. And the fossils that I study now are biology when you look at the bones, but they're so hardened, they're fossilized, they are rocks. So, I think studying geology at the university and also liking biology when I was a kid combined [probably] led to the paleoanthropologist that I am today.

But after I graduated from college, this was during the Communist era in Ethiopia, you were actually assigned to work somewhere [through a draw]. So, I just picked up a [one]. It says, "You're going to work at the National Museum of Ethiopia." That's how I ended up at the National Museum of Ethiopia. I think

that is what was a game changer. I may have heard about Lucy and others before that, because when Lucy was found, I was I think five years old. But I was not really into the business of paleoanthropology before I joined the National Museum of Ethiopia. But once there, I started seeing these prominent scientists coming from different parts of the world and going out to the field, spending hours and hours at the museum. And my first ever office was a big hall where you had all these fossils that had been brought back from Hadar and Omo. These are the famous Ethiopian sites where you have fossils like Lucy.

So, what really impacted me as a human origin scholar, [during] my early stages, and really shifted my interest to human origin studies is the space where I was assigned to work in. But I don't have really a person to point to or an inspiring individual scientist to point to. So, that's why I say, it was serendipity. But once in, I was [hooked], and I don't think anyone can extract me out of this business until I die.

MAGGIE LEMERE: That's amazing. Thank you for sharing that. Well, I'm just curious, what did you think when you got your little piece of paper? Had you been to the National Museum before? And I'm curious what you remember from the first time going, because it's probably evolved over the years as you've continued, I'm sure, to interact with it. But yeah, just curious more about what your thoughts and feelings were at the beginning.

ZERAY ALEMSEGED: I will be honest. When I got the [draw (piece of paper)] to go to the museum, I was not happy. I'll tell you that. So, growing up, as I said, people and parents will tell you study engineering or medicine or law, something like that. I didn't do that. So, I studied geology. And by way of studying geology, I was mainly aiming at the Ministry of Mines or the petroleum companies as a normal person who wants to go out, do something and then make money, and life goes on.

Then, of all the students, and there were I think 45 graduates, the three of us were assigned to the National Museum of Ethiopia. For me, the National Museum of Ethiopia was a place where you have artifacts, of course, objects from churches, pottery and things like that, but I was not really able to right away connect, that by going there I could study human origins. It was not something that triggered right away. So, I was not as excited as you would expect, especially when I [compare it to] the excitement that I have for what I do today. It's almost ironic that I was not excited when I was assigned to work at the National Museum of Ethiopia. Because, before that assigning students who graduate in geology to places like that [was not the tradition]. So yeah, it was quite an experience, so I was not very excited.

MAGGIE LEMERE: I appreciate your honesty. It is true I think that sometimes the more you know, the more interesting something becomes, and it almost can become something of endless interest and passion, which I imagine could be true for you and others. But was there a certain experience where it started to shift and it started to kind of catch, like, "Oh, this is actually really interesting," and, "Wow, this object is so profound?" I'm just curious how it started to shift as this seed, which has become this incredible career, began to grow.

ZERAY ALEMSEGED: Well, I think that's fascinating. One of the most important questions is [probably] what you just asked. Because it did not take [even] a week to really get excited by what I was seeing. Imagine you are in this big hall where you have fossils that date back to three, four, five million years ago. And every day you have big scientists, very prominent people that I knew from literature, coming through and spending hours and hours. And then you have this army of scientists with their vehicles going out back to the field. Places, even though I'm from Ethiopia, had never been to the Afar and many

of these famous sites. And most Ethiopians actually don't know where these places are, so I was not really the exception.

But what made a difference in my view is the immersive nature of that place that contains those fossils, being surrounded by all those fossils every single day. You're in at 8 AM and leaving at 5 PM. And this immersive context of being surrounded by the fossils and the activities of the many big scientists within that context and the ability to ask questions about the fossils, [meet] people who actually made the discoveries. Imagine when you were there and Johanson, who discovered Lucy, comes, you had the opportunity to ask, "Oh, so tell me about Lucy." How often does this happen? So, it's a combination of the space that contains the fossils, but also interactions with people. So, it didn't take me long.

In fact, with my two colleagues, what we did is we said, "Okay, why don't we sort of identify sites?" Even if our boss didn't tell us, we said, "I think I'll say I [will read about] the Hadar site." My friend said the Middle Awash site, the other said the Omo site, and we would have a mini "journal club" within the three of us, where one would report to the [two] of us and the other would do the following week. So, it's the context that created this very dynamic interaction, both with my colleagues, but also the opportunity of being exposed to those accomplished scientists. But really critically, it's the immersive nature of being present every day in a place where the entire collection that came from different sites of Ethiopia, including the Lucy site, I think that is what made the difference. Once hooked, I was just very difficult for me to get extracted or to extract myself from that business.

MAGGIE LEMERE: It's amazing. I love imagining the young you in this first week and this whole world that opens up. And it speaks very much to the power of having that hands-on experience and the different people, as you said, this dynamic experience. So, I'm curious how long you spent there and how that eventually... I know you went to France for your PhD, but what that trajectory was like, and if you have any particular memories that really stand out.

You were mentioning starting to do field work. And it's also cool to hear that that kind of gripped you. I have so much respect for paleoanthropologists, because my impression as an outsider is that it's very tedious and very hard work but also requires a good amount of serendipity and luck to some extent. So, just curious what that time was like and how you decided to dedicate yourself to the PhD, kind of what you started to see as even a career at that point in paleoanthropology, and what you saw as the different options. I'd be curious about all of that.

ZERAY ALEMSEGED: Yeah. So again, when I did interviews in the past, people would ask me, "So, how old were you? Were you like two year old or three years old when you got excited about..." I tell them, "I'm sorry, but that's not my story." There are people whose passion started much earlier, much younger. That is true. My story is unique, and I think that's why it's interesting. As I said, serendipity continued actually in my life, because after joined the museum and I [participated in] one field [season] in the Middle Awash, and then I think it was about a year and a half or two [after college], a scholarship was given to the National Museum by the French government. So, the French government would say, "we're going to offer a scholarship to one young student who would go to France to study." Or it could be from Japan, it could be from the US, and in this case it was from France. My colleagues and I applied.

In fact, I didn't know who was going to go, but then there was another field season by a scientist called John Kappelman from Texas who was going to go to Southern Ethiopia to do field work. So, I was assigned to join that team, which was very exciting. Imagine, so you have John Kappelman coming from Texas, a big professor, and I'm going to take part in his expedition. So, this is very exciting. I remember it was a Monday or a Tuesday morning. I came to the office with my backpack and my small things for the

field, and they were gearing up. They were getting ready to go to the southern parts of Ethiopia, which takes two or three days [on the road]. And upon arriving at the museum, they said, "Well, I think there is a change of plan." And I say, "What happened?" "Well, you are the one selected to go to study in France, and your friend will replace you to go to the southern part of Ethiopia." And I said, "Really?" "Yeah." "Well, okay."

So, I gave my backpack to my friend, who then joined Kappelman from Texas to Southern Ethiopia. I stayed back and I started to process the paperwork at the French Embassy. And before I knew it, after three months, I ended up in Paris, not speaking a single word of French, to do my masters and my PhD in French. So, the other person actually who joined Kappelman to go to the southern part of Ethiopia, did the field work with him, and ended up joining Kappelman in Texas to do his PhD, and now he's a professor of geology in Addis Ababa University.

So, it is things like this that really led to how I ended up in France. Again, that was a complete serendipity, unplanned. I [thought I] was going to Southern Ethiopia. [But was] told [inaudible 00:20:39], "you're going to Paris." "Okay, I guess I will" So, I ended up in France, not speaking French, but I spent eight months learning French in a place called Vichy, in the central part of France. From scratch! Then after that I went to southern part of France, Montpellier, to do my masters in paleontology. After that, I went up to Paris to do my PhD. So, that's how I ended up in France also to be a paleoanthropologist trained in France in French. And yeah, the rest is history, as they say.

MAGGIE LEMERE: Incredible. It sounds like you had to have a certain amount of an adventurous spirit or courage to just jump on an airplane and go to Europe and stay and learn a whole new language.

ZERAY ALEMSEGED: Yeah, when I landed in Paris, again, that was my first ever trip out of Ethiopia. I didn't speak French. And at that point, English was not really commonly spoken in France. Today you go [there], you can speak to [most] young people [in English]. But then [that was not common]. And I landed, and the people who were supposed to pick me up didn't show up. So, it took me I think six hours to go from the airport to the place that was going to send me to Vichy to learn [the French] language.

So, I can tell stories about that. You can imagine changing buses and all of that [without knowing the French language]. I can't afford a taxi. So, it became quite an adventure. I think it could make a chapter in a book if I write a book. So yeah, it does take a big sense of adventurousness and courage, but also the determination to live in wherever your job takes you, and that's what continues apparently. And that's why as we will go further, you will see that I have moved a lot from place to place even after my PhD.

MAGGIE LEMERE: That's incredible. I feel like sometimes these fields are also intimidating. You were mentioning all these famous scientists and discoverers who were in the museum. Did you feel like at that time you got to know them as people, so it was a little less intimidating to go and pursue these studies? I'm always just curious about how other people deal with kind of... I've interviewed many scientists in the Natural History Museum, and a lot of them, their parents went to Harvard and Yale and Princeton, and they have that "From two years old" story, so I'm just curious, did you feel really confident, or was it kind of scary as well at times?

ZERAY ALEMSEGED: It was not scary. I think I am good at separating the human and the anthropologist, or the human and the Pope, the human and the president. So, that's what happened when I met Obama

or the Pope, I respect them, of course. These guys deserve all the respect that exists on earth, but they're human beings also. In fact, they do try hard to make things easier for others, so the communication is easier. Yeah, so what I did is I had a lot of respect for these people because they deserve, but I was not intimidated. I think I'm good at separating the two. Because at the end of the day, you and I have our own career, but, well, we are also humans. So, if you really think that he is a human being like you, statistically speaking, he is good. That's how I see it.

MAGGIE LEMERE: Yeah, I guess doing human origin studies too could be helpful in that way because you realize how human we all are.

ZERAY ALEMSEGED: Yeah, exactly. Yeah.

MAGGIE LEMERE: I'm also curious, because Ethiopia, you were mentioning Lucy is and has been such an important place in terms of human origins research. Did you realize the confluence of these special opportunities, and did you have a certain pride, I suppose? I'm just curious how you thought about that.

ZERAY ALEMSEGED: Yes, it has evolved. Yeah, I think you're right. I think I had pride bordering, I would say, nationalism at the beginning. Because when you're not exposed to other cultures, you are so secluded within your small territory. That's all you know. So, there is this pride that emanates from knowing yours too much, but not knowing others.

So, I think at the beginning, yes, especially when I moved to Paris in France at the French language, I can still vividly remember that was one of my attributes. But then as time goes by, and especially as I learn more about human origins, as I learn more about human commonalities, anyone from any part of the world are as proud about themselves. They may not express it, that [expression] may be different from place to place. They are very proud about who they are, where they come from. So, what I said is, "Okay, it's okay to be proud, to have the pride, but just remember that others are also in that same box." So, then that takes you to the, okay, then we respect each other. So, I have become, I think, less nationalistic for good reasons.

For example, when I was younger, when I was at that museum, when people said, "Ethiopia, the cradle of mankind," I had not had the realization that you and I, even I am from Ethiopia, you were from wherever you are, we are actually [equally related to Lucy], meaning I'm not closer to Lucy than you are, and vice versa. So, that's through the study of human origins that we know. So Africans or Ethiopians or Kenyans, do not have the monopoly of that origin. So, the pride is shared. From the technical point of view, it's like if you have a very nice flower in your yard, you are going to be proud of that flower, but it doesn't mean that the species to which that flower belongs belongs to you. It's everybody's flower. So that's how I see it here also.

So yes, you're right, at the beginning, I did express some pride about the place where these guys were found, but now it's completely overtaken by the commonality, by the fact that, in fact, whether something is found in Kenya or in Ethiopia or in South Africa, they pertain to humanity, to all of us, the eight billion people. So, if someone was tomorrow to discover a five million year old hominin from Norway, I would be as excited and as happy as I would be if someone did that discovery in Chad or in Ethiopia.

So yeah, that has evolved. It's one of the things that evolved dramatically, is how I managed to contextualize who I am as a person, who I am based on my background, but also the meaning of

studying human origins and how a shared heritage that is and really shared by every single of us. So, that is probably the driving force now for me, is [that as] I am studying Ethiopian or Kenyan fossils, I am studying a shared heritage that belongs to you as much as it belongs to me.

MAGGIE LEMERE: Well said, yeah. When I first saw the collections in the Natural History Museum in DC, I was like, "Wow, this is our human heritage." It had never really struck me how profound that was. And I've also enjoyed interviewing certain people, including activists, who kind of sometimes go through this arc of nationalism to humanism, and humanism actually sometimes ends up being the more radical and necessary thing, even if-

ZERAY ALEMSEGED: Yeah. Yeah.

MAGGIE LEMERE: But of course, human origins research can be kind of political. I was talking to Chris Stringer at one point about the Out of Africa model and how there are some people who are so hotly against that, and of course the science has kind of proved that out. So I also appreciate your comments within that framework. But I'm curious, as you were going into your graduate studies and your PhD, being a human origin scholar, it occurs to me that there's so many different ways you could think about studying human origins, because we're talking about millions of years, so many different human species. I think for me, when I started learning about this, I was like, "Oh yeah, the word human applies to so many different ancestors." So how did you really start to focus in on the deeper time of the separation and understanding our maybe more ancient ancestors, if that's an appropriate way to put it?

ZERAY ALEMSEGED: I think one thing that had become clear from the get-go when I joined the museum at the age of 22, I think, and the excitement I described earlier was sort of fermenting, and interactions with those big great scientists, really spending time in that immersive space that contains fossils. One thing that was clear to me is that I had, unbeknownst to me maybe at the subconscious level, I had decided that I need to lead my project and not just always follow. Meaning, I had sort of taught myself, yes, I will learn from these giants, from these great scholars, but at some point I will have to also hold the steering wheel and lead my own project, which led to the first Ethiopian-led paleoanthropological mission ever. That's what I did in '99 when I started the Dikika Research Project.

And that is because the excitement of looking at what had been discovered is immense, as I described earlier, because it's immersive. The excitement of following those who make is also great, actually. It's a unique opportunity, but nothing can replace the excitement of discoveries that you actually take a lead on, whether your team is four people or 50 people. So that's why when I made the discovery of the Dikika child, you'll see that there was only one scientist on site and that's me. So that was a my team.

There were so many ups and downs as you can imagine, not to mention, go through the French language and then understand the French culture and then completely different from the Anglo-Saxon type of education that I had in college. It's not just that I was challenged w to get training the way you become a paleoanthropologist, but also to actually get training as a human being immersing in a completely different culture, language and civilization in many ways.

But because I am focusing on the end point, end game, so to speak, I managed to [succeed]. So for example, when I moved from the French language to Montpellier, which is in the southern part of France and joined the master's program, I was the only non-French person of the twelve or so. The professors are teaching French students, of course, as they should. They didn't know that I had just gone

to Vichy and learned the French language from, [starting with] "Bonjour," and then I'm now [sitting] with French students who have been speaking French since they were little. [The pace] was so fast that I was [almost] unable to take notes at the beginning. So I was going to class with, I don't know if you remember, we then had Walkman, it's called. We didn't have the iPhones and all that. So I would go [to class] and record everything that the professor was saying, and this is a very intensive curriculum.

The class is for six hours, and by the time I get home and I'm transcribing, it was easily 3:00 AM 4:00 AM and that lasted for six months. I think I was sleeping maybe three hours a day or something like that. I always say if there was a challenging moment in my life, I think it was doing my master's in French because the three things came at the same time. The culture, the language and academics, so I had to navigate through the three of them. I think the PhD work was relatively okay because I had already acclimatized and adapted to the system, so that was easier.

[It is true], a transition from the small fossil containing space in the museum, and then after two years, finding myself in Montpellier to do my master's was quite a transition. But a transition that really allowed me to hone my French language, but also to really demonstrate to myself that it's doable. Yes, it's hard, but it's doable.

MAGGIE LEMERE: What kept you going? I would just say all of those factors at once could be so overwhelming on a human and probably having some level of homesickness, like missing food, family. I'm just curious how you managed and in a sense, any insights you would have for other young scholars who might also be facing multiple challenges like that.

ZERAY ALEMSEGED: Honestly, I don't have the answer. I'll be honest with you. Because for two and a half years, and this is the first time out of my home country, and before French, I spoke three languages. I spoke English, Tigrinya and Amharic. These are Ethiopian languages, and for two and a half years I almost did not have the opportunity to speak the three languages with which I grew up. So what was really the driving force in my view is the idea that if I want to achieve what I outlined at the beginning, and that is I wanted to be a human origins scholar and to be a human origins scholar, then you would have to do what it takes. And if what the takes is to learn French, then do it.

If what takes is not speak English and focus on French? Yeah. In fact, at some point, even when I speak English, of course I have my Ethiopian accent, but [I started to have some] French accent when I spoke English. So that's quite interesting. That's how much immersed I was in the French language in the same way that I was immersed in the place where I had the fossils and the hall that contained the fossils [in Ethiopia]. So I think the force behind accomplishing whatever I have accomplished then was the idea that there is a target and the target is to be a human origins scholar. And it could be painful, it could be challenging, it could be tedious, but it has to happen. So it's a determination. There was nothing else that I could really point to.

MAGGIE LEMERE: I'm curious if you want to speak at all about your family and what they thought of this big pivot in your career from geology and maybe working in mining to human origins and being in France studying a whole new language.

ZERAY ALEMSEGED: My family, at first communication was not as easy as it is today. There was no cell phones then. This is in the '90s. So where we lived in the hall, in the dormitories, there was one phone on the wall and when someone calls you, "Room 550," and then they would knock at your door, you

would go and talk to them. So communication with my family back in Ethiopia was not that frequent, that's number one. But I think overall, because they knew that I liked adventures and I liked weird stuff, I think they found comfort [in knowing that], they found solace in knowing that I was doing what makes me happy.

And it's true, I was happy, especially when I was studying the French language. It was so transforming. You have these people coming from Japan, Korea, Denmark, America, Canada, Africa, [and] all in one place learning French, and for eight months, I think from a cultural point of view, it was a very transformative experience. I made many good friends, still we are in touch. So that was good for me, good hiatus from real school, just focus on something that is completely different, but also interacting with people who are completely different, both intellectually, but also their background.

But first the communication was very limited, but my family was just happy. They just found, I think comfort in knowing that I was doing some crazy things that I liked.

MAGGIE LEMERE: It was the beginning of what's been a very global life and probably with a lot of just colleagues from all over the world and friendships. So you were mentioning that your target was, you want to be a human origins scholar, and you also mentioned at some point it became really important to you to be the leader of your own work. I was just curious if you want to talk a little bit about what your expectations or your hopes were, what you even saw as the possibility kind of at that point.

I'm curious too, I'm such an outsider, but I didn't really know the term human origins. I'd heard of paleoanthropology and all of these different things, but it seems like there's a lot of intersecting approaches. You mentioned that geology has ended up being really useful, but just curious what you thought this journey might be like. Has it tracked to be like that or just some of the things that you're thinking about at the beginning as we talk about how it actually went?

ZERAY ALEMSEGED: Yeah. So the study of human origins, again, remember things are going fast. I graduated in geology. I was not happy when I was assigned at the National Museum of Ethiopia, but right away, this immersive context transformed me. I started liking it and I see there's people coming and doing research. So I said, "Okay, I want to study human origins." Paleoanthropology, that is. But remember, I really don't know what I was exactly looking at. So this is something that is metastasizing, that's morphing as I was think about it. I think the great thing that happened to me is that because I did not have a set of expectation beyond just being a human origins scholar or paleoanthropologist leading my own project, I did not have a nicely framed idea of, "Okay, this is what I would like to be." Because many students my age in the US, my students for example, would come to my lab and say, "Professor, I want to study how the shoulder works."

And they'll say, "No, no, no, I want to study how the pelvis works. I want to study how the face evolves." No, for me, it was not that. My ideas were still fermenting. They were in their infancy, they were juvenile if you want. All I had was bits and pieces of information from my readings and from what I hear from other people, but I think... Maybe I'm wrong, but I think I'm not, I had somehow synthesized the big picture of being a paleoanthropologist, and I was just aiming at that. Meaning, whatever things I do, whether I work on the shoulder or the pelvis or the face or the leg or teeth, that is just an introduction to the bigger sphere of being a human origins scholar. I think I had managed to articulate that and that's what happened exactly.

So moving to Paris, therefore, I worked with one of the most prominent paleoanthropologists, Yves Coppens who had done a lot of work in Ethiopia who introduced me to another professor who closely mentored me. His name is Denis Geraads. I remember when I met Denis, because I had insisted that I

wanted something hands-on. That's what I really kept insisting and what he did is he pulled a drawer of fossils... This is in Paris, fossils that were exported in the '60s from Ethiopia, but had not been really studied well. He said, "Well, why don't you figure this out?" So he just gave me a drawer of fossils and he said, "Figure it out." I think that is what I asked for, and that was probably the best experience. So he gave me something unknown. I had to convert it into something known. In fact, my first ever publication was published in 1996, and it's the result of this drawer that was given to me when I moved to Paris in '94.

So, for me, yes, I understood the big picture, but the nitty-gritty, the details of what I would do were following slowly and progressively. That's why also the deep time, going back to 3, 4 million years ago, is when I finished my PhD I said, "Okay, as promised now I want to have my own project." Then I would have to identify a site where I can do that." So, I went through the geological reports and other information in the archives and I identified this site called Dikika, in '98. '98 is when I finished my PhD. I moved back to Ethiopia after three months, and then I started exploring the archives and the Dikika site was sort of available. It was available because it was a bone of contention between two local tribes, the Issas and the Afars. It was a dangerous place, that's why it was available.

So I said, "I will figure out the diplomacy and the politics and do work there." Here is another example of [how] I would do whatever it takes to accomplish my goals. This is a good example because when I went to Dikika, I was shot at many times. Again, the two [groups] are fighting over grazing land. These are pastoralists. So when someone, an outsider goes and sits between the two, it's not really the best decision to make. So most of my time was spent not only making roads, [used for] the polio vaccine now, but also really going into the intricate local politics and diplomacy to ensure that I could work at the site without being shot at. Because the two parties, they never see eye to eye. So if they come in into some type of proximity, they shoot at each other.

I think being able to work at Dikika epitomizes, it really highlights how dedicated I was. At that point, when my family actually got involved and they literally begged me to pull out and just, "Forget this business of human origins." Because it became too dangerous. When I was in Paris, they were happy.

As I told you, communication was poor and they said, "Okay, he must be doing [something good]..." But now when they heard that sometimes I was shot at, then that's when my family started to say, "Well, maybe we should open some small store for you so you can do something else."

MAGGIE LEMERE: Makes sense. Moms always want their kid to be safe.

ZERAY ALEMSEGED: Exactly.

MAGGIE LEMERE: Well, I'm curious with the Dikika site and the conflict that was happening and you were literally sitting in between it, what was it that you did that enabled you to have safe access? Did you convince them on the merits of your work? I'm just curious what that conversation was like and what you think you brought to it that made that successful. Because it occurs to me, there's just so much conflict in so many important places. I work in Palestine and it's very, very difficult to gain access and to navigate those situations, and it requires a lot of strategic thinking and thoughtfulness and human skills and all these things. But I'm curious how you were able to do this and maintain it, because I know it ended up being a really important site for many years also.

ZERAY ALEMSEGED: Yeah. Well, again, the driving force was that, "Okay, I've decided to work at Dikika and I will." Now, how do we do it? That was a question. Well, because people are shooting at me and that's not good, especially when you take other people with you, it becomes even more dangerous. So what I did is, first I was naive, as you can imagine. Very naive, actually.

I told the two parties, "Well, I'm going to work. There is no need to fight. You are both Ethiopians. If you want to work with me, you can join me." And I would bring some soldiers with me or the police sometimes to sort of keep an eye. And the first season, actually, I tried to bring three from one side, three from one side, six people, and I was happy. I said, "Okay, let's do work." Later that I realized that it was very, very dangerous to do that because when we were [doing survey]. So there is three from one tribe, three from the other one, and I had two soldiers. And then I said, "Okay, let's go ahead." Because my team is so small, that's just me now as a scientist at that point.

And the soldier came [to me]. He said, "Hey doctor, I don't think these guys are working. Just look at their hands." So their fingers were actually at the trigger. The two of them were with me actually to assert that the area is theirs and not to the work, because what matters to them is that the area belongs to them, whether there is a fossil or not. So I said, "Okay, this is not going to work." So I went back again to the local administrative offices and..., this is a very long story, so all I'll tell you is it took, the first year, it took a month and a half of diplomatic shuttle from village to village, from a district to another to convince one side to move out just during the times that I do field work.

Basically I became, I don't know, a diplomat or a politician at this point because for a month and a half, that was what I was doing, talking to people and things like that. Also, logistically, I didn't have a lot of money at that point. I was camping next to the river because then I didn't have to set up shower. I would just go to the river, take shower [in the river], which is infested with crocodiles. So it's just the financial challenges, the political challenges and the dangers that pose when there is conflicts was one of the things in my view that also shaped me as an individual because I don't think I'm the same person now relative to what I was before.

It was really painful sometimes when I read my diary and it's just... One administrator would make your life so miserable. I remember once I was at the place talking to this administrator and he said, "Okay, follow me and let's meet at this place." I said, "Okay." The place I didn't know was 200 miles away, so I had to drive 200 miles. By the time I got there, the guy actually had gotten back to where we were and then I had to drive back. So in one day I had to do, I don't know, 600 miles back and forth to just chase this person so we can convince the people, the parties to... So we can do work.

And that's why I say, okay, it's good to study human origins. It's good to be a paleoanthropologist, but once you practice the business, I think over 50% of the things that you do are not paleoanthropology, especially if you're doing field work. There is a lot at stake, especially in my case. I was shot at three, four times. I should say that as I grew older, now today, when I go, I don't take as much risk now, but also I can't afford to do it because I have [a much larger team]. At that point it was just me, the scientist, and then some local helpers. Now I have 50 people going with me with 10 scientists. So it's very bulky also. It's not a easy endeavor. The place that I work at, there is nothing waiting for us. There is no camp. As I say, always, it's like I carry the village with me, plant it, and then when I'm done after two months, I pick up the village and take it to Addis. So that's what's happening.

MAGGIE LEMERE: Yeah. It sounds very different and I'm sure you're in a position of a lot of responsibility if you have students. It's interesting to think about how we can change. Do you ever miss the old days when it was just so scrappy and just you camping?

ZERAY ALEMSEGED: Yeah. I remember once it was just me and the four locals and it's in the middle of nowhere. We had only one tent. They were staying outside and they woke me up at 2:00 AM in the morning to ask for a salary raise and I did not have much money. And I said, "No, I don't have."

And, "Okay then. Thank you. So we leave." Imagine. So just going to be me in the middle of nowhere. I remember the moon was beautiful. And they said, "We'll leave."

"No, why don't you guys leave tomorrow? You can't leave [me alone!]."

Said, "Well, we have families, we're going to go." I'm a bit adamant also. So I said, "Okay, you go." So I went back to my tent, my heart is trembling and then it was by the sand, by the river, so I can hear every step of the [feet] as they walk away. My heart was trembling. So they were gone for an hour and then I hear something again. I think they came back, they realized that I was stubborn, so they came back. I said, "Okay, we'll stay here today. We can't leave you alone, but you'll have to leave tomorrow," or something like that. So it's just things like this added that make this project successful.

MAGGIE LEMERE: I appreciate you sharing those things. As a story of a scientist... one of the things I'm really interested in is telling stories of scientists. Sorry, don't know why this is ringing. One of the things I'm really interested in is how do we communicate that it's not just a straightforward path and process, especially for field work. The role of empathy and curiosity and teamwork, there's so many other skills that can end up being critically important to your success. I feel like if we are able to tell the stories in ways that show the range of skills and that some of these other skills can be learned too, it could feel more accessible to more people. And that feels exciting.

ZERAY ALEMSEGED: And each of us have a unique trajectory. So I remember once there was this, it will remain unnamed, but some company came to do a documentary on me and my work. They had this picture of me that they wanted to portray. You have this poor African coming from the poverty and then emerging and then going to Paris and then becoming this international scientist. And as I told my story, actually it was none of that. I was not the poor African they portrayed, they wanted.

I was not the passionate paleoanthropologist when I was five. It's not true. And all the picture that they had, they wanted in their movies, it was not true. Why? Because my story is unique, as your story is unique. And I think they gave up because they didn't find the person that they were looking for. So what I'm saying is if people really told their stories, I think each story is great, but my story is not this prototype, a kid from Africa who went to the heights of scholarly world. It's not true. It's just a process and I like it.

MAGGIE LEMERE: Yeah, I appreciate you saying that. We need so many more stories, many different types of journeys for all the many different types of people and experiences, especially when we're thinking about some of the really major challenges in my work. I do a lot of work around the environment. We need all kinds of people to see a path from so many different ways, so many different types of skills, and to think that there's space for them.

But going back to your field site, Dikika, you ended up, I'm putting together that you made your first major discovery not that long into working there, which is pretty incredible. But you must have had a pretty good hunch for why you chose that site and what you were looking for and what you thought could be there. So I was wondering if you wanted to talk more about from a scientific and human origins perspective, why you chose the site and what you were thinking you were looking for. Did you know

that you were going to be looking for the *afarensis* or was it... Just curious about how you ended up thinking about the questions, or what you were looking for there, specifically.

ZERAY ALEMSEGED: The site of Dikika is north of the Middle Awash, where you have specimens like *Ardipithecus*, and Herto, and many great fossils. And it's south of Hadar, where Lucy was found. So it was not really. It's not a brainer to want to go to a site that's sort of sandwiched between the two sites. Again, the main challenge was access, because I had to make the road myself, and also danger. Risks of being shot at. So the hunch, the guiding trigger was mainly that, sandwiched between the two sites.

But once in, of course, first accessing the site itself was very difficult. There wasn't a road, I was the first person to actually drive a vehicle to the site. In fact, I remember the cattle, the animals, the cows, goats and sheep. When they see this big Land Cruiser, I think they see that, they think that it's some type of white carnivore or some animal. They would just run away. So it took time for them to realize that it was not a very dangerous predator, or something like that.

So of course, not just the road, but also the access to the site, because of the things I described earlier, was very, very complex. Actually, it was very draining. The politics is very draining. You can go to a site, start work, and someone will come stop you. And you'd have to sit down for two hours, to discuss things. So that was very draining. It was physically challenging, it was mentally draining. It was dangerous. But the main scientific reason why I went there was, it's because it's sitting right in between the Middle Awash and the Hadar site.

But once at the site, it was like any other site, you would have to walk and walk and walk. And when you have a small team like mine, and in '99, it was me, a ministry rep, two soldiers, and three locals. You can't cover big spaces. Soldiers are just not really looking for fossils. The people, the locals actually had no exposure to paleoanthropology before, because these are called the Issas, the Afars are who know more about fossils. So I'm the only person who knows about fossils on site. So when we do the survey work, it's basically a one man team that is trying to make monumental discoveries.

And it's during that process, I think it was the second season that we made the discovery of the Dikika child, or Selam. Even on that day, I remember it was during what the Muslims call Ramadan, this is a fasting season for the Muslims. If you work in the Palestine, you probably know about that. And the locals, who really have so much stamina, because they know the place. We did survey in the morning, in the afternoon, all of them said, "We can't continue. We are exhausted." Well, I said, "Okay, then, I understand." Because we had breakfast. They did not have breakfast. So we continued, and we were far removed from where they were, and breaking time was approaching because it was about 5:00 PM.

And they started yelling at me, screaming from up in the [ridges], and then it's around 5:00 PM that the discovery was made. And very excited, I started looking at the geology and all that, and it took, of course, some time. They were so mad at me when I went back to pick them up, and go back to the camp, because the breaking time was passing. Imagine, this is hot, water is not very available. So even the discovery itself was made in a very difficult situation, where the locals were so exhausted that they couldn't follow me, and they had to stay back. So it's... Yeah.

MAGGIE LEMERE: I mean, it's extraordinary to me that people like you can look at a fossil and can tell us such a meaningful story. And I know it takes time to uncover the layers of that story, but in the moment, were you able to look and know this was incredibly significant? Was it that fast?

ZERAY ALEMSEGED: Yes, it is. Because the thing that was clear was, it was a hominin, meaning it belongs to the human lineage. And the hominins are so rare, that if you do your math, when you go to Hadar or Dikika, the sites where we have these fossils from, only 0.5% to 1% are human remains. So they're very rare. And when you find them, they're either a fragment of a tooth, a leg, or some fragmentary bone. So the fact this was just a hominin, belonging to the human lineage, but you have the face and many parts of the skeleton, which was covered at that point. Well, you can call it a jackpot. It's just something that, I knew that we would find something, but something like that was just... Well, it's unheard of actually, for a juvenile specimen. It's unheard of.

So in fact, remember, the locals had not worked with other scientists before. And they're still curious as to why this guy, who is a doctor, coming to the middle of nowhere and roaming the landscape, looking for old rocks and bones. So they still are working [on the] arrangement, still fermenting, still growing. We still didn't know each other. Now they are my good friends, but at that point, no. So what I told them was, "Well," remember, they're fasting, so they are not with me now, when it was discovered. So I had the ministry rep and the soldiers, I told them, "Well, let's take a few pictures. This is a primate and interesting." And then I said, "We may go back to Addis tomorrow, actually." I said, "Really? Why? We'll see."

So I didn't really make a big deal out of it, because I didn't know how the locals were going to react. I wrapped the thing with toilet paper, and put it in my bag and went to the camp. And I told them we were going to break the camp after two days, before the planned day. And they were sort of confused, "What's happening?" And I said, "Well, I need to go to Addis." And I'm doing that because I didn't want to stay with the fossil, in this very shaky camp, where protection is not so great. So I had to go back to Addis, put it at the museum, and come back with more material for screening and sifting and sieving. Because I did not have that material, to sieve and to screen.

Of course, the sieving and screening process took another four years, but on the first year, just after the discovery, that's what we did. There was no celebration. There was no Lucy in the Sky With Diamonds, and things like that. But yeah, it was interesting.

MAGGIE LEMERE: It sounds like exciting and a little bit terrifying, now you have this thing, and you can't let anything happen to it. And yeah, I've met Louise Leaky when I've been in Tanzania, and heard about her work. And how there's just so many people walking, day after day after day, for years sometimes without finding a hominin.

ZERAY ALEMSEGED: Yeah.

MAGGIE LEMERE: And so, the fact that you found it, I think it sounds to me like it was kind of destined. And I read that it took something like 10 years to fully kind of, excavate or reveal-

ZERAY ALEMSEGED: Expose, yeah.

MAGGIE LEMERE: ... Selam's face, and just the level of continued commitment sounds pretty extraordinary. But do you want to talk about the significance of the discovery, and what some of the major questions were in terms of human origins research, that this incredibly rare child fossil from Australopithecus could begin to shed light on?

ZERAY ALEMSEGED: Yeah, so I think the significance of the fossil is manifold. First, now we have access to the face of these early hominin juveniles, so we don't have to speculate. We say, if we want to know how the young or the juvenile *Australopithecus* are, instance, the Lucy species, how they looked, we have Selam. So you looked at it, at her, and that is it. So that's big, huge information. That's number one.

Number two, because we have the endocast, which is the sandstone impression of the inside of the skull, basically the shape of the brain, is preserved. The shape and the size, in a form of a sandstone. So imagine, the animal dies, of course the soft tissue will decay, will disappear, and the skull is filled with matrix, with sand, with dirt. And it has endured for the past three million years, so what it does is, it's like a mold. It mimics the shape of the brain, but also the size of the brain.

And not only then do we have the face, but we have the brain size. And if you have the brain size, you can ask the question, "Okay, we know humans, by the age three," let's say over 60% of their brain is formed. But in chimpanzees, over 90% of the brain is formed. And that's why chimpanzees can cope up with their environment much faster than humans. We are very miserable, very helpless when we are born. We cannot give birth to a baby, and let them go, and ask them to make it on their own. Whereas if you look at an antelope, or a horse, they're born and they just start walking. Humans can't do that. And that is the result of evolution. And chimpanzees cannot go right away, like the antelope or the horse, but they're better than humans. Meaning by the age of two, they still can go around in the trees and collect food, and humans cannot do that. They still need to be breastfed, or at least fed with some type of food.

So the question is, and that is because our brain grows, slowly, and at birth we have only a small portion of the brain formed. That's why we have externalized brain growth. We take it out, because we cannot give birth to a fully grown brain. Human being, if we do that, we kill the mother. Already, giving birth is difficult process. So what [evolution did] is, "Okay, if you want to have a big brain, what you do is you give birth to a small brained infant, but the brain continues to grow outside." That's why we need care.

So then what we did with Selam's brain size is, "Okay, so how much of the brain was formed in *Australopithecus*, in the Lucy species?" You can ask the question, thanks to the discovery of Selam. And as it turns out, while the brain was small, actually not all of it was formed. Less of the brain was formed, like what you see in humans, which means that some type of childhood, or this dependence of juveniles on adults, was existing in *Australopithecus afarensis*.

So not only do we have the face and the shape, but we can access actually the behavior of these early hominins, in terms of childhood. What we call the post cranial elements, or the skeleton below the neck. For example, the scapula, the shoulder blade, gave us information in terms of whether *Australopithecus afarensis*, the Selam species was climbing or not. There was a longstanding debate: some people would say, "No, no. They were adept bipedal walkers, and climbing was not really important for their survival." And there are those who say, "Well, climbing was important for their survival," and Selam told us that indeed climbing, in the species, was very important for their survival. And there are many other questions, in terms of how the teeth grow and develop, that we were able also to address using these questions.

So, big questions about morphology, big questions about locomotion, big questions about childhood and brain development, were addressed thanks to the discovery of the fossil Selam. And because the skeleton is complete, we actually can talk about how high, how tall were they? How big were they? Relative to the adult size, for example. And a plethora of questions, we've addressed already, but more is to come because it's really a trove of paleo anthropological information that we have uncovered.

MAGGIE LEMERE: Incredible. And I think I read that this is still the oldest, most complete human-

ZERAY ALEMSEGED: Juvenile, yeah. Juvenile.

MAGGIE LEMERE: ... juvenile skeleton that we have. It seems like you were still relatively early in your career, and to make such a major discovery, how was that on a professional and personal level? The responsibility that then, I guess caretaking and beginning to work on these questions. I'm curious what that was like, just for you, as you began to navigate how you were going to work on those questions, professionally?

ZERAY ALEMSEGED: Yeah, it was a process, I should say. The moment of discovery was really a huge sense of happiness, excitement. But really quiet, because there is no way I would go out and scream and yell to express my excitement. But followed by huge sense of responsibility, also, making sure that the specimen is safe. Over the time, however, the way I saw the discovery and its impact was, there cannot be a shortcut to make the relevance of this fossil less or more. It has to give us the type of information, and the amount of information, and it can take as long as it takes.

And that's why the preparation work, meaning the removal of the grains, the sandstone, grain by grain. And literally grain by grain, using dental instruments, took 12 years. And I was down at the National Museum of Ethiopia, and all I did was sit there, and just remove one by one, the grains. It was very tedious. But for such an extraordinary specimen, you owe it extraordinary care, in order to extract extraordinary information with the aim of addressing some of the extraordinary questions in human origins. And that's what exactly happened, I think.

MAGGIE LEMERE: It strikes me as you're talking that you must've developed a very intimate relationship with Selam, spending so much time. It wasn't just a thing that you found, and kind of wrote...

ZERAY ALEMSEGED: No, it is not. Remember, the removal of the grains, one by one. I remember every single piece of bone, by heart, now. So yeah, it's very intimate. It's not actually the type of romantic relationship that people talk about, it's not. It's really extracting the scientific information, and really knowing exactly what is what, and what type of care will be needed that piece of bone so it is not destroyed, or we don't lose information. So, it's a very intimate relationship that you have and when you look at the type of, the amount, the amount of data, the amount of information that we were able to extract from the bone, from the fossil, is just extraordinary.

MAGGIE LEMERE: Yeah. Well, I think a little later I want to get into, we talked at the beginning about, what does it mean to be human? And you started to, laid it out, but I feel like human origin scholars, you have a unique perspective, because you've spent a lot of time thinking about it. And it must just be interesting, you were talking about, it's not romantic, but also more than most other people, 99.9% on the planet, you've imagined the lives of our ancestors. And I suppose, having that intimate relationship, you must have thought about what Selam's life was, and some of the hominins.

ZERAY ALEMSEGED: Yeah.

MAGGIE LEMERE: So, you were talking about the amount of time that it took, and how you had to let the data speak for itself. And this is probably incredibly important, that you did this well, and it took time. And I think I saw that you did have a Nature cover, and National Geographic, and eventually you had that moment. And I'm kind of curious how you continue to navigate your career as this happened, and you said you moved around a lot, and obviously I know you've continued to be in Ethiopia doing your field work, and spending time in the lab. But yeah, how you continue to build your career and your journey from Selam, and having made this critical discovery.

ZERAY ALEMSEGED: Yeah, I think, given what we said already, if there is one thing that is probably unique about what I've done, that is , the discovery of Selam was great, and it remains great, and it'll continue to be great. But for me, that was not the end point. So I said, "Well, we still should go look for more." And that's how we ended up actually making the discovery of the earliest evidence for stone tool use at the Dikika, also. Which is only 200 meters away from [where] Selam was discovered. So that continues, the adventure continues.

But I think I have also evolved into moving from... So the discovery is continued, but from discovery to actually thinking about what I do. "Okay, discoveries are great, but why am I doing it? What are the questions that I'm interested in?" And that's how I ended up writing the review paper in Nature, I don't know if I shared it with you. Where I really, this was published in 2023, last year, May. Exactly a year ago. And what I do there is, "Okay, what is that I want to know, what's the thing about human origins, especially *Australopithecus*. So, it was reappraising *Australopithecus*, Paleobiology was the title.

So putting things in perspective, is what I'm really excited about. Not just based on the discoveries that I've made, but also discoveries that were made by others. You put all of that together, and then, I want to understand not just Selam, but understand *Australopithecus*. I want to understand hominins. I want to answer bigger questions, because as much as the discoveries like Selam is great and extraordinary, it's important to know that they're just one data point. A holistic answer to the questions around human origins can only come if people like myself have the... I would say the audacity, to bring all that together in a synthetic manner, in order to tell a coherent story. Otherwise, it becomes like this eureka moment of, "Oh, I have discovered Selam, I have discovered *Ardipithecus*, I have discovered this [and that]."

Those are important, because they are the trigger. They're the trigger that launch us forward. But that's not the goal. Discoveries are triggers. So I'm moving from the discoverer to the synthesizer, in some ways. Because ultimately, as we said in the beginning, my goal is not just to discover, but to tell a story. A story that pertains to all of us, the eight billion people. A story that makes sense, not just to the scientists, but to the average person who is curious about his origins or her origins. Even to those who are creationists, but want to understand what I'm saying. I cannot tell them, "Okay, here is a premolar, or a molar or a leg bone, and this is why I think our ancestors lived three million years ago." That's not how it works. I would have to put that in perspective, in context, and tell a consistent and a coherent story.

And to do that, we have to go beyond discoveries, and then really, use those discoveries. And bring in novel techniques, these new techniques of imaging visualization, CT scanning, synchrotron techniques, and sophisticated statistical analysis, so we can tell a complete story of our origins. And that's what makes, I think, the study of human origins more exciting today. Because it's really, it has come far, far, since the days where a discovery in the desert would be the talk of the day, and then, we were happy. I don't think that's enough, in my opinion.

MAGGIE LEMERE: Well, as a storyteller, I always say that stories are about making meaning, and that's really what storytelling is, and that we're trying to weave kind of the threads through the events. It's not really the events, but it's how we remember them and make meaning from them, and that's something that some of the folks I've interviewed in this project, in human origins, I think do really well. Is help us think about our place as *Homo sapiens* within this planet, especially with the consequential things that are happening right now.

And it sounds like you have a very dynamic set of activities that you're involved in, from writing and lab work and teaching, and then thinking, to a broader public. So I'm curious, what do you conceptualize, or how do you think about your day-to-day, between these very specific questions, and scientific discoveries, and research and measurements and then communication and telling a story. What does your week or your month look like, and how are you balancing all of this? Or things around the public side of it, too?

ZERAY ALEMSEGED: Yeah, so the public side is interesting, and you can do it in two ways. You can do it in a planned way. Say, for example, we have outreach programs here, where myself and my students go to a school, or to some event at the museum where we highlight the story of human origins. But also, really, some high profile places. So for example, when President Obama visited Ethiopia, I was asked to tell him a story, the story of human origins, but also the history of Ethiopia, in five minutes. And how do you tell a six million year old story in five minutes, is a challenge in and of itself.

But I think thinking hard about the takeaway messages, and then really understanding your audience, how much time they have, is fundamental. So when President Obama then came, I was given five minutes, and then I told the story of human origins, based on mostly Ethiopian evidence because that was a topic then, and then other artifacts from the more recent times in Ethiopia. And he was so captivated, that even though he had come for five minutes, he spent 20 minutes with us. And then he said, "Thank you," we made jokes, and all that. And then he left. But then he came back with people who had accompanied him during the trip. And then I told him, "Well," so he said, "Can you please tell my friends what you told me?" And I told him, "No, well, at this point it's up to you. You know the story, you tell your friends. And he did this, and he stood his ground, he told the story like over two minutes.

So the public outreach is done both systematically, but also opportunistically. Systematically means you plan it, you go to the museums, the way we do it. But opportunistically, like when I interacted with Mr. Obama, or even the Pope at the Vatican Church, where I am a member of the Pontifical Academy of Sciences, I go there. I spend time, we talk about human origins, human evolution, in some of the unlikely places, for example, in this case. So I think the key to that is, that human origin scientists do not own the story of human origins. They are the technicians. They are the people who make the story, who tell the story. But it's important to know that the story actually belongs to all of us. Meaning that then, it should be shared to the extent possible, in a more succinct, more objective, more respectful manner.

And that's why I like what happens in museums, for example, at the Smithsonian and the American Museum of Natural History, and places, they're striving to tell stories that are those, of course scientifically consistent and coherent, but also respectful of other people. So without compromising the scientific data, I think we can communicate with most people, because it's an interesting story.

Yet the public outreach for me, however, should not lead the scientific process. It should follow the scientific process. Some people, in trying to make some people happy, they would tell stories. No, that's not the right thing. I think stories should follow data. Stories for me, are a simplified narration of data. That's what stories are. Otherwise, it becomes a fake story, which especially in this context, would be sad.

MAGGIE LEMERE: Yeah, we're struggling with a lot of that in our society.

ZERAY ALEMSEGED: Yeah.

MAGGIE LEMERE: Well, not every human origin scholar, actually, that I've interviewed, or people who do human origins scholarship related work, necessarily care as much about this. So I think why, for you, does communicating this story... Why is it personally really important? And what's it been like, on a human level, to be an ambassador of our story to so many different people in different places, with their own versions of the story? I'm just kind of curious.

ZERAY ALEMSEGED: Yeah. Well, if there's someone who is interested in conducting human origins research, but they don't want to share it with others, I think they're defeating the purpose, in my opinion. I'm not a big fan of people who wave the flag, go around, and tell stories before the scientific story is established. I think that's not right. But I think, ultimately, when you are engaged in human origins research, the goal is for our species to know its place in nature, which is going to shape and guide its role in nature. And the best way to make that happen, in my view, is to educate every single [person on] where we come from, where we are today, and where we're potentially headed. Of course, that part will also add other factors, not just human origins research.

So, for me, it's just a derivative of what I do. I don't really put much effort. It's very organic. I do what I do so I can tell a story. I do what I do so I can answer questions. Charles Darwin in 1870, in his book, predicted that some of the earliest human ancestors would be found in Africa, and this is during the Victorian time, imagine. He basically tells us Africa is the cradle of mankind. He did this not because he had the benefit of the genetic and the fossil evidence that we have today, but based on his observations of the similarities of African apes to humans. That blows my mind. Someone sitting in London or in The UK, answering a question that is so complex, despite the cultural and political and religious barriers.

And what do we find today, after all those fossils and genetics? Well, he was right. So that story has shaped how we function as a society, I think, how we behave relative to other creatures. So the reason why outreach and public education is important is because what we do is directly relevant to the eight billion people that we have today. So we cannot expect every human origin scientist to be on top of explaining to the public, because there is variation and we vary. We don't have the same energy. That's completely understood, but in principle, I personally do what I do to primarily answer scientific questions, so I can place my species in the bigger scheme of things. That's number one.

But once I did that, it means that I have a story to share, and that story does not belong to just the scientists or just the Africans. Most of the things were discovered in Africa, but as I told you, Africans do not have the monopoly of that ancestry, nor do scientists have the monopoly of that knowledge, in my view. So sharing it is, at the very least, it is the right thing to do, but if we want to make an argument, well we do our research using taxpayer's money, so there is something of accountability, also.

MAGGIE LEMERE: Yeah. As you were speaking about where do we come from, where are we now, where are we going, the basic story, right? There's so many different ways of thinking about where do we come from, and the questions that you research help us think about new ways of thinking about that, which is just so illuminating and interesting.

And I'm curious, you are a human being studying what it means to be a human being, and so how do you think doing this work has affected you personally, not as the paleoanthropologist, but just as a person, in terms of your outlook or your worldview or how you see society and some of the things that we're grappling with or how you think about how we're dealing with our place in nature? Do you think it makes you optimistic, pessimistic, neither? Just kind of curious about that level of it, because you kind of have a bit of a deeper story to look at than most other people even have the awareness of really. Just curious.

ZERAY ALEMSEGED: Yeah, so the paleoanthropology work that I do, of course, is a scientific endeavor, and when you conduct scientific research, you have to be, to the extent possible, emotion free, so you can focus on data and answer questions. So the numbers and the data should be the guiding tools shaping whatever you think and whatever you say when you talk about human origins research. So that cannot be compromised, meaning, data, numbers, statistics, broadly speaking, scientific approach should dictate how you do your science and what the implication of your science is. So there should not be any compromise there.

But that being said, during the process, as a person, as a human being, I think one thing that has shifted, in terms of myself, is I think I have evolved from the nationalistic type of person I was to a more humanistic person. So I'm more of a humanist now, meaning, for me, humanism, you can find it, if you Google it, what it means, but for me, it's basically humans, if we respect each other, if we understand our common roots, if we understand our common destiny, then a more harmonious relationship across individuals, across populations, across countries could make our planet better.

So when I think that way, it may be naïve, may be almost idealistic, but there is no problem with being idealistic. I think that's the target, it's not bad to have a target. So I think I have moved from a more narrow sort of slightly nationalistic person to a more humanist that I am today, and I'm happy about that.

MAGGIE LEMERE: Yeah. That makes sense. There's so different many ways, I guess, to think about the human story that maybe, in some sense, that we're these ultimate survivors, learning that there were other species here, even though we were. But also, that the environment will continue to shape us and how we are able to survive. I'm curious how it's shaped how you think about time and your own life on this planet, as well, if that's something that comes up for you.

ZERAY ALEMSEGED: Yeah, in fact, time and the climate change issues are really critical. Before I joined... well, as a geologist, I understood what time was, time dimension going back to the origin of life, origin of earth, all of that, I understand. But when you practice, it's very different from when you take lectures on something, of course. So sometimes I would go out to the field and make some discoveries of fossils dating back to three, four million years ago, and then go to the city, we're having a beer with my friends and when I tell them, "Oh, what did you find?" "Three million." And some of them say, "What is three million?" See?

So moments like that give me an idea how far I have come, because I would probably say the same thing unless I was in this business, because three million years is a lot of time. Yeah. So the notion of time is different for you when you practice this business, I think. That's number one. Also, the climate change issue, if you go out now, especially in big cities, many would agree that climate change is happening, it's bad, et cetera, et cetera. But it's very hard for most people to connect the direct impact that it will have

on themselves, because they don't have the trajectory through time and how climate is actually one of the major factors making all the changes that we witness across the planet.

Based on my work, I can see that extinction and speciation, meaning the emergence of new species and the disappearance of species is happening when climate change happens. I can see that animals are trying to do everything that they can to survive, and if they can't, they disappear. When you have access to that type of knowledge, human beings become just one type that are also going to face or are facing or actually are contributing to facing those challenges themselves. It could be in the form of carbon emission or bleaching the coral reefs, et cetera, et cetera. So yeah, the work, therefore, does shape how you see time, but that also really allows you to put things in perspective, in context, when you try to also look forward and try to be, at least tangentially, relevant to our species as we struggle to mitigate the current challenges that we have. That's number one.

So both time and the problem of climate change that are really now relevant to all of us, whether we like them or not. This past winter in Chicago, it was so mild there was no winter. And I don't know, people who ignore this, I think, scares me, but that's a fact. Things are changing. So the relationship between humans and the environment, I think, is better contextualized when we have access to the type of data that I explore, meaning through time, I can see the relationship between our ancestors and their environment, and I know what happened to some of our ancestors. And I know why, we, as a species, became the most dominant and widespread species that we are, living in places where we don't belong.

I tell my students, when I teach in winter here, "Well, you don't belong here." If someone insists they do, "Well, why don't you remove your jacket and go outside." So we belong because we became this tool adept species that can create the tools that we are using here, the heaters, the ACs, and all that. So yeah, the time and the environmental change aspects are really fundamentally and intricately tied to the study of human origins.

MAGGIE LEMERE: Yeah. I feel like, I guess, humans, we inevitably live in the now, and it's hard for us to have that perspective of how the environment changing can change our experience so fundamentally. I really like your example with your students. And to that point, I'm curious what you're really passionate about when it comes to communicating human origins to the broader public.

Are there things that you kind of wish people generally knew that maybe they don't generally know or is it just the curiosity to know about this field? There's certainly many people who are very excited about it, as laypeople, but then there's probably a lot of people who still might not know about Lucy or Selam or some of these other stories that are part of us. So I'm curious, for you, what types of things you want the public to be able to know or grapple with?

ZERAY ALEMSEGED: It's actually very simple. Really, if people realize, I mean, genuinely understand, that we are an integral part of the greater biodiversity, in the same way as a cat, a dog, the primate, the rhino, the elephant, the monkey, but of course, we also have our unique features that make us who we are. There are unique features that makes a fish a fish. That's why, again, I ask my students, "Are you more evolved or less evolved than the fish?" And they will say, "Of course, more evolved." "Well, then if I put you in the sea, who will be more evolved?" Yeah.

So I think understanding the context, understanding that we are one integral member of the greater biodiversity, and then you can compliment yourself after that. You can tell, "No, no. We are better in this, in this. We use computers, we use rockets, we have the ability to go to Mars." That's fine. Those are called autapomorphies. They are called unique features for that species, but the giraffe has a nice,

beautiful neck, also, that's unique to it. So really understanding the place of humans in the greater biodiversity is one thing I'd like to convey. And the second one is that unique place that we have as an integral member of the greater biodiversity, is the result of a long process of evolution. It just didn't happen like that.

So if I can convey these two messages and people understand them, but not just understand them, accept them, recognize them. But first, they would be doing justice to themselves, because they are understanding something real, but that realization will also lead to changing behaviors, in my opinion, because once you recognize that, your interaction with other species will be very different. And the question you asked earlier about the time dimension, meaning we are the result of a long process, will also be relatively easily crystallized in our minds. So, for me, it is understand that we are an integral part of the greater biodiversity, and that belongingness is the result of a long process of evolution through time.

MAGGIE LEMERE: I love those answers. As a filmmaker, I'm really interested in those exact same things, telling stories where we understand ourselves as part of a community and the farmers I work with in Palestine actually call their trees as though they're their children, and they see themselves as part of a living community of things, which is something, I think, we don't have enough of right now. So I have a couple more questions. We're just about at two hours, so I can maybe give you a couple wrap-up ones, and then we can always do a second interview, if you would like.

So one of those was just, what's exciting to you, interesting to you, about the future of humans origins research? What questions are you most interested in or maybe it's technologies? Another way to think about this is, what do you hope the field will continue to do or maybe do more of? I just kind of want to hear what you're thinking about. You said it's changed a lot since you started, and I'm curious about what you think about where this field is going.

ZERAY ALEMSEGED: So yeah, the field has changed almost dramatically since I started 25 plus years ago, and the major shift, I think, occurred as a result of, number one, improved technological tools, analytical tools, investigative tools, owing to the ability of these highly powered computers, which led, also, to highly powered imaging and visualization techniques. Remember, we paleontologists or paleoanthropologists, our primary tool are our eyes. We look at the bone, we look at how it looks and we say, "Oh, this is human-like, this is dog-like, this is cat-like." That's what we say.

So meaning, we have these novel techniques, new techniques of imaging and visualization, it's giving us extra millions of eyes. We're basically becoming an uber-microscope to really examine things that we could not see previously. So, for example, the ability to go to the inside of the bone, to explore the internal structures, we call them the trabecular and the cortical features of the bone, so we can understand how the bone was reacting to stress, biomechanically speaking. It's thanks to those tools of imaging and visualization techniques. So technology and power of analysis, analytic powers, and power of visualization and imaging are transforming the field. That's number one.

Why? Because, primarily, our job is based on our eyes. We analyze morphology, shape and form. That's what we do. That's number one. I think the second aspect, which is very promising, is the world of ancient DNA. The ability to extract DNA and protein, paleoproteomics it's called, proteins and DNA from these ancient bones. And if we really expand that, in time, and start to find ways to extract DNA, like we did it through the Neanderthal from these ancient bones, going back to three, four, five million years, that would be fantastic. I think that's probably the new frontier going forward. I don't know when it's

going to happen, but I'm sure technology will help us to at least extract protein from these ancient bones.

So the way I see our field of research, of human origins, going is a marriage between three things. Number one, continued field work, as we did it in the past, for many, many years, make fossil discoveries. There is nothing that can replace that. That's number one. Second, the use of novel techniques of analysis in imaging and visualization to explore and understand these ancient bones. But also, a better understanding of our closest relatives, like the chimpanzees, gorillas, and orangutans and other primates. And, of course, really improve our techniques, so we can access, if possible, DNA, if not, proteins of these ancient species. I think a marriage of the three or four elements is what's going to take us forward in the field of paleoanthropology and human origins studies.

MAGGIE LEMERE: Thank you. I guess that maybe it's the importance of collecting. I was going to say, is there anything you want to say that doesn't get lost as we go into the future?

ZERAY ALEMSEGED: I'm not sure I understood the question.

MAGGIE LEMERE: Oh, yeah. I was just thinking, with the field changing a lot, is there any core practice that you would want to make sure future researchers don't forget? And I was thinking, maybe, you said fossils will always be important, so maybe it would be the importance of collecting, still, or something like that. I was just wondering if there's a foundational thing you'd want to make sure people remember to keep.

ZERAY ALEMSEGED: Yeah. So collecting fossils and making new discoveries is foundational, because the only access to the past are the fossils. The new techniques, the new technologies are and add-on to analyze those bones. So the foundation of paleoanthropology will remain the fossils. But then, the study of those living animals, like the chimpanzees and the gorillas, is also fundamental, because there is a trove of information there.

But the use of ancient DNA will also give us access. Ancient DNA is nothing, but a form of fossil, also. So there is nothing that is going to replace fossil discoveries, going forward, but we should not be stuck in just discoveries, because our story cannot be told by just making discoveries, but by really thinking hard and extracting as much information as possible from those discoveries, using new techniques, new methods, and then, whenever possible, ancient DNA and ancient proteins.

MAGGIE LEMERE: Thank you. Well, I think my final question, wanting my best to keep us on time, is just looking back at all of these inflection points and serendipity or fateful accidents with you getting that slip of paper and the scholarship and all the things, and you've mentioned that you're part of the Pontifical... I guess, I can't remember the exact term.

ZERAY ALEMSEGED: Yeah, Pontifical Academy of Sciences

MAGGIE LEMERE: Yeah, and the American Academy and the association and you've achieved so much, you've been in the most elite institutions in the world. I saw that you're also with National Geographic as an explorer, you're an emerging explorer. I mean, these are the types of things that one could only kind

of dream of and it almost might feel ridiculous for many of us think, "Oh, I'm going to be that," but you've gone and it seems like your genuine passion and really hard work, as you were talking about, learning French, so that you could do graduate school.

And here you are, continuing on the path, and I'm just kind of curious how it feels to look back at what you've accomplished and to think about what it means to you to have spent your life in the study of being human and thinking about these really big, but very important questions that, as you said, help us place who we are in the world. And yeah, how it feels to even just reflect on your story over the past couple hours of where you came from and where you are today.

ZERAY ALEMSEGED: Yeah. Obviously, I'm happy that all those good things happened to me, but I think the secret is that I was not really aiming at being a member of the academies and the institutions or the prestigious places, because if you aim at that, then you won't expose yourself to get shot at. So I think the key, for me, has been my belief and my commitment to the process and not to the eureka moments. The process of really answering one question at a time, the process of conducting one field season at a time, the process of not being swayed by any reason, including when people shoot at me. I think it's those things that have shaped whatever trajectory I have taken.

So looking back, my presence in those prestigious institutions and academies and all that, was really a byproduct of the process of hard work and all that. So, for example, I remember when I was in a panel at Harvard, a review panel, when the nomination for the Academy of Arts and Sciences, which is, as you know, a prestigious place with the Oprahs and the George Washingtons and all of that. And one colleague in the panel said, "Oh my gosh. I became a member." "Of what?" "Of the Academy," and then we congratulate her and all that. We were all happy and all that. And then, after the panel, I went to my office and I opened my email, actually, mine was also there. I didn't know it.

So it's the same thing with others, also, you don't even know, at some point, who's nominating you, how you're making it there, it's just the process taking you. So I am a strong believer that, stick to the process, and then when those things happen, it's fantastic, it really feels great. But when they don't happen, because you're not anticipating them, you won't be disappointed, also. And so, yeah, so looking back at what I have accomplished, I am very happy and proud. But the target was always what I told you at the beginning, focus on making sure that I do what I'm passionate about right, and other things sort of followed, and I'm happy about that. Yeah.

MAGGIE LEMERE: I think that's really beautiful insight, for so many reasons, including that, I agree, I don't think you can set our thinking you'll get those things or aiming for that, it has to be emergent from doing good work and doing hard work. But also, you can't have your self-worth tied to external validation. It has to be about, I guess, being in alignment with yourself and your own goals and the process, and if you get too used to those things, or maybe even the idea that you're going to discover some big thing every year, it's not possible. So I think being in the process and evolving and thinking about the ways that your journey is carrying you is just a lovely piece of insight to share. Is there anything else that you wanted to add before we finish today?

ZERAY ALEMSEGED: I think it was good. Yeah. I think we could stop it here. And you can listen to it, if you feel that there is something missing, then we can do another hour or 30 minutes, to sort of add stories, if you want.

MAGGIE LEMERE: Sounds great. Well, Zera, I just wanted to thank you, before I turn it off, for you really generous and authentic sharing of your personal experience that goes along with your incredible scientific achievement. And I think the way that you communicate is really accessible and caring, and I think a lot of people are going to benefit from it, so thank you for meeting today.