

# AI and You

Transcript

Guest: Eric Daimler, part 2

Episode 152

First Aired: Monday, May 15, 2023

Hello, and welcome to episode 152! Today we will conclude the interview with Eric Daimler, founder and CEO of [Conexus](#), a company that solves companies' data deluge problem with CQL – not sequel, C-Q-L – a platform based upon category theory, which we'll hear Eric talk about. Eric has over 20 years of experience as an entrepreneur, investor, technologist, and policymaker where he served under the Obama Administration as a Presidential Innovation Fellow for AI and Robotics in the Executive Office of the President. He served as the sole authority driving the agenda for U.S. leadership in research, commercialization, and public adoption of AI & robotics. Last week we talked about autonomous cars and what the regulatory environment for AI in the USA looks like. Let's get back to the interview with Eric Daimler.

This makes me want to talk about application to business. I was having an interaction yesterday with someone looking at applications of AI to their business, and it was very data and process-driven. And this person had precise rules in their head, so it could have been solved by linear optimization. But the problem with like large language models for that is they're too fuzzy. I like to joke that a machine learning expert is someone who says that if the computer says two plus two equals 3.97, they're done. And we have this tension between problems that can be solved with approximations, like recommendation algorithms. "You like this, you then try watching this, try buying that." those are great examples of what can be done with large language models to generate creative content. Again, excellent. But then we have things like industrial control processes where you have to have precise numerical rules. And some of those are fuzzy enough that you could train supervised learning on them to do a good job. And others, you can't afford anything less than a hundred percent accuracy, which is not what you usually get with training AI, because if you do, you've overfitted it. To look at what you were saying about guardrails, which you mentioned several times, in the context of what I've just been talking about in a business, how do people looking to - because there's this huge conversation now in business, I've gotta get on board, I've got FOMO, I've got to move with AI, but they're looking for guardrails too, because just throwing something like ChatGPT at some of their problems will break horribly. Where should business people be looking for guardrails? How can you help them?

Well, this is where I spend my time, is working with organizations. As much as I find many of these Hollywoodesque, I'll say telegenic, media friendly AIs to be fascinating personally, I find them to be of limited value for many of the organizational problems that I deal with, either from my time at public policy or from my time now as an entrepreneur and an investor. We need zero tolerance outcomes from many of these models. And I'll make the problem you just defined as

worse. The worst problem isn't that I merely have to have two plus two equal four, not approximately four. I need to understand when I'm given a number or an equation, or a model from my colleagues, that I incorporate that model in a life and death way, sophistication, whatever. So the example is that if I created an airplane fuselage, one of my colleagues created an airplane wing, we might each have a number for vibration. And it's not about whether those are exact or not, although it is what's much worse is as the wing and the fuselage are added, were our components, our knowledge, our models for vibration additive, or did they cancel each other out? And then if I add the engine, same thing, right? This is how the problem goes for sophisticated systems. You're going to extrapolate that to any number of other industries in any number of other applications. But just talking about the construction of a commercial aircraft, it's in the models that are constructed among my colleagues that then demand a collaboration for the operation, let alone just a creation of these increasingly sophisticated systems that demand an AI. How this happens today is an increasing number of data scientists or business intelligence professionals using some nice commercial grade tools will create in many cases hundreds, in some cases, thousands or even tens of thousands for maybe the Fortune 50 business intelligence queries that will run an organization of size. And these could be any number of queries. You know, how does the weather affect the operation of my solar array today? How do the five different windmill manufacturers integrate in the database that defines their operational constraints, for example. As we migrate or upgrade the underlying applications and, and domains, whether it's on-prem or cloud of the underlying IT infrastructure, we need to make sure that these components at the high level that the board sees, that the manager sees, maybe just a contributor sees for just ordinary business intelligence operations, has guaranteed integrity regardless of what happens to the underlying technical infrastructure. You know, that's a way that you have to look at a generative symbolic AI. You're not going to use a large language model for that. If you think all that it is too deep and too technical, I just encourage people to, to look into what happens today and what's going to need to happen in, in AI. This is the way people need to be thinking about these technologies. Today, that's a real manual process where you have people literally going line by line, even sometimes cell by cell in a database, comparing these tools as they're migrated, as they're upgraded to guarantee that there's no corruption, and it can demand, an 18 month or 24 month cycle sometimes, that impairs the organization's ability to be flexible and respond to changes on the ground, whether it be in weather, whether it be in price, whether it be any number of supply chain disruptions name your variable. So where, where people can, can then you know, take this into their Wednesday afternoon, is think about their work with increasing precision. And so today a lot of us - we started this conversation earlier talking about the degree to which sometimes laws are insufficiently defined to allow for autonomous vehicles to make a safe stop that a human might find reasonable. There is a seemingly bottomless selection of rules that define many of our work products and our collaborations with our colleagues that would benefit from further more constrained definition. Ultimately, so a machine can read it. That's the way we participate with this technology. We might have a machine that then kind of automates us out of that particular job. But if you don't participate in the automation of yourself or your work, then you will either become an artisan which is fine, but it can be a little precarious, but far worse and more likely is you're just going

to be surprised when the abruptness of technology and digital transformations comes for your job, and you didn't know it was coming.

Where do you think this leaves people who are running businesses right now in terms of their reaction? What's the stress level, the nervousness scale for CEOs, C-suite people right now facing this historic once in a generation, maybe once in a lifetime level of disruption, that they can now clearly see affects them in ways that they know they cannot fully comprehend?

You know, the concern and attention, I think, is appropriately high today. I think everybody better be paying attention to not just what the large language models can do today, but what this implies just about the state of learning algorithms more generally. As they say, non-machine learning AI or large language models are kind of a form of machine learning. So more broadly be thinking about how artificial intelligence and these learning algorithms can apply to their businesses, where everybody needs to be spending more time. I think there's a great deal of attention that needs to be spent on this.

There should be the potential here for a massive improvement in the way we manage our businesses. As you pointed out, AI can understand and reason about a trillion data points where humans cannot. Running any kind of business is about reducing complexity, simplifying. Because at some point that business has a trillion data points that you can't understand and you rely on something pulling those together into something that your brain *can* encompass, like preferably a graph that goes up (hopefully one that doesn't go down), but something that you can understand. Now, AI has the potential, right, to take all of this complicated data and be the bridge between that and the limited size of our brains. Okay, so that's not a question. So, comment on the opportunity scale and, and then where should business people be looking to try and, and find those opportunities?

Subject matter experts need to be involved to define what data sources mean. I'm not an expert in anything really. I know I don't know medicine. I'm not a petroleum engineer. I'm not a climate scientist. I'm not an expert in supply chains. You know, subject matter experts need to define what data sources mean. You know, is this a kilogram or a pound? Is it even a trivial example? Some subject matter expert needs to define that you know, as we compose knowledge, we don't have to always have to say two plus two equals four. We can just say four. As we look at squares and we can combine these squares together, we can say, that's a cube. Now I've constructed. And so these things do compose, and they can be made simpler over time. But the subject matter experts are the ones that actually need to define those, those artifacts. The AI can just discover the commonalities for, allow, allowing for collaboration between these. What an individual contributor can do today, all the way up to the board level, what they can do today is just think about with increasing precision, how they define these actions, exactly what do they want to have happen and understand the details of how these things are going to happen. I think too often I find that companies are outsourcing - and it's not to bad-mouth consultants, but they'll sometimes outsource to consultants saying, wow, this is just such a mess. I want somebody else to take care of it. Which it can be fine but they'll often not understand the way that that work may be impairing the business's flexibility. It's a mess for a reason, and it may

need to be cleaned up. What we're finding is that over a generation, we have a lot of people doing these terribly manual, or we'll say vocational, level technology tasks that are overeducated for the work that they're doing, and will benefit by having a discussion themselves inside these organizations to find what higher value work may be a more appropriate use of their skillsets. And these manifests itself, unfortunately, in databases. It can sound tedious, but that's where knowledge is, that's where it resides. You know, people talking about the data being the new oil and all that, and it's fine. Everybody seems to have gotten the memo, but what we now find in 2023 is that people have collected a lot of data, and they're able to use only a small fraction of it. They thought that that would be some sort of panacea, I'll collect all data. And I literally did hear this: "Well, I just want to put all that data into my AI and let have the AI come up with some new version of what my business could be." And that is just - I often don't like to say things are stupid, but that's like among the dumbest things I can hear in this domain. That is not how it works. That's not how the technology works. You're never going to get there from here. You need to be thinking about what *exactly* do I want to automate? What *exactly* do I want to learn? Not just can I have an insight? I mean, that's, that's very 2015. Give me some insights from AI. I need to think, what do I want to automate? Where do I want to make my life easier? Very specifically.

And I think the striking thing about the example you gave there that you said that is a stupid approach, is that it is absent any expression of what that person's unique value proposition is. Like, why are *you* there? Is it just to push the button on the AI? Well, anyone could do that. Why are *you* in part of this business? Then there's got to be something that you bring to it. And that wasn't in evidence. I want to talk about something when we were talking before the interview started. You mentioned you were working on a book and that has some in, in intriguing aspects to me. So can you introduce us to what you are working on in that book?

Yeah. The working title for the book is "The Future is Formal." The plan is that are coming out next year, published by Simon Schuster. With The Future is Formal. The idea that I'm working to communicate is that as our world expands and it's knowledge, let's say the world is becoming faster and there's this seemingly explosion of expressiveness available from our use of large language models or from these other forms of a generative AI. There's a whole infrastructure underneath that demands our attention. the way we need to define our underlying, underlying infrastructure needs to increase itself in, its, in its solidity and in its precision. The term, the future is formal, really comes from the vernacular that a computer scientist uses to describe that phenomenon, which is formality. It means at the base level, these things need to rep be represented by a mathematical proof. Now, that, that doesn't mean that everybody needs to be involved in that particular level of - solidity, we'll call it. But that, that world *has* to exist and, and demands certain increasing attention contemporaneous with this explosion of this higher-level expansion of knowledge. You know what is less known than the amount of data increasing exponentially is the amount of data *sources* have increased exponentially. That means that the intersection of these data and data sources has a combinatorial explosion that represents knowledge. How one thing relates to another is what we mean by knowledge. Not just Eric's height or Eric's age or whatever, that, that's not terribly interesting. But how Eric's behavior relates to his geography or relates to his age, or relates to height. Now, that's interesting. You

know, I could make money off of that, would be how a business will think about it, or I can, I need to watch safety behavior for it was how government might think about it. How we represent that in the world in a *solid* way *has* to be a part of our thinking in order for us to trust our underlying infrastructure. Now, we had that in the past but it's happened over a number of years. You know, we work on a commercial bank over a century, and we have practices in place that we've tested and failed and improved to make a banking system at least more stable than it used to be a hundred years ago. You know, same with many areas of manufacturing. Same with many areas of transportation. but in a digital world, we need to be attending to that formality much more quickly, and we need to do it in a principled way. So the idea of the book is to not only make evident all these potential vulnerabilities, so we don't in the, in the worst case have some digital Tower of Babel that collapses by its underlying infrastructure fragility, but we also can teach in the book the ideas what we can each do to participate in the strengthening of that underlying infrastructure so that we can trust these systems as they grow in size and sophistication.

Is this formality the same or similar to what engineers call 'rigor'?

You could say it's rigor in its most expressive form. It ultimately needs to be represented by a mathematical proof. And we do this in other places - an F-22 has a formal definition of its underlying operating system. I don't need that for my laptop's operating system, but I'd prefer that for the F-22. I, you might prefer that for my commercial aircraft as well. We have this in semiconductors because you can't afford at the scale at which these transistors are replicated on semiconductors to have any sort of errors. but I don't need that in the camera that we're currently using.

And when you were referring to infrastructure there, is that like the information technology plumbing of a business, or is it bigger than that? Or was it something else?

It's really everything. So the where, where this is going to find expressiveness in the next decade is in cloud infrastructure where you know, today we have clouds - Amazon Web Services as Azure Google Cloud, for instance, the hyperscalers - that have originally been built to support e-commerce and digital advertising. They weren't built to support airplane manufacturing or something with life and death circumstances. So over time you will find formal clouds. Every layer of the stack from the application layer down to the bit movement layer will be formal. Amazon started this project in 2018 and they'll be working on it, many billions of dollars spent over the next several years. the NSA's working on it, NASA's working on it. This is what a cloud infrastructure is going to look like. Same thing for smart contracts. So I often get discouraged when I hear people hyping cryptocurrency in, in these vapid exchanges. It may very well be true that many of these cryptocurrencies will see wide adoption, but just saying it's going to be true and, and giving *ad hominem* attacks to disbelievers is not really helpful. I see almost no one, with a few exceptions, being able to define what is the technical path that's required for the wider adoption of cryptocurrency and smart contracts. I'll tell you what that is so all your listeners can know, and it is this formality stack, so companies like Hedera Hash Graph that can be called out as a good actor in this business are working to define formality first of all at the contract layer, but layer later, they'll do it deeper at the consensus layer, and then be finally,

before they get to the bit movement layer. That whole stack will need to be finely defined formally before, for example, the US military ever, ever relies on smart contracts.

And this is where I hear government involvement creeping back in, and then I'm reminded of the risk layers defined in the European Union AI Act, because there are places where we need formalism and places where we don't: we don't need formalism in AI being used to generate a description of a football game. We do need it in medical devices. And there might be an intersection between today's large language models and medical devices, if you start using AI to approach the - I don't know, the kind of fuzzy areas of medicine where you need a lot of data to figure out things like neural responses just to give some example. So, do you see that this needs to be driven by some kind of third party, say, government, defining, "here's where we need formalism. Here's where you are going to be formal. We don't care about these other areas."?

You make some good points where when we're exploring, when we're testing, it's fine to explore and test. They may be where that statement "move fast and break things," could, could find a reasonable application. There's a lot of domains where I don't, that are not life critical, but certain domains emerge as, as life critical. And virtually every medical application seems to represent that. So that requirement I think seems like a natural place for government to play a part from clinical practice to research, even billing, because that influences in individuals medical care can now be represented with a scalable symbolic AI. I really would love to see America and its allies, really every developed economy, begin to put more resources into finding ways that they can formalize their work and use symbolic AI to develop and strengthen their underlying infrastructure to develop trust in, in their digital systems.

Wow. Thank you. Time, unfortunately, is limited. I've asked a number of unfair questions, and you seem to have rolled with them pretty well, so I'll ask another one. Our crystal balls have collectively gotten a lot cloudier over the last few months, I think. And for the people who are trying to figure out, is this going in a generally positive direction or not? Where do you think that AI could take the state of business in the next 10 years broadly? Does that look better to you? Better along what sort of dimension?

Well, I am often reluctant to talk about timelines. So the original lesson I was taught when I became a venture capitalist in Sandhill Road is we should not be confusing a clear vision with a short time horizon. That might be the most generous view of how Elon Musk talks about Tesla's autonomous vehicle technology. But it's coming - don't know when you know, people sometimes will talk about that with regard to artificial general intelligence, or what used to be called AGI or sentient AI - that it's possible, and it sure is dangerous if it ever comes, but the general consensus among my friends is that it's highly unlikely in the next 20, 30 years and probably never. And yet - and yet - there are a lot of very dangerous issues around even non sentient AI to which we can be attentive. So that's really an important caveat in that answer. I find from, from my years doing this, that I have a pretty good idea of what's going to come down the road one year, two years, but after that, even three, it becomes a little fuzzy. So the idea is to become as adaptable, as flexible, as fast and nimble as absolutely possible. That's really the best advice I can give, not just for individuals, but even for increasingly large organizations,

adaptable and nimble is where to play out. I find that if I looked back, the, the easiest place that I messed up, messed up is I could have defined broadly you know, what an iPhone would look like, but I didn't invent the iPhone, right? I couldn't have found the shape of an iPhone that shaping all, all the components that, that found expression as the iPhone. And I definitely could not have predicted that there was going to be a new job called App Developer. And I *definitely* could not have predicted there would be a new job called Influencer. So it, it doesn't take too many years out in the future before my predictions would begin to be ridiculous. What I can say with some conviction, however, is the things that I'm representing in the book, and this is why I'm really writing the book that I'm writing is I want this to have a little longer lifespan. so I'm writing on things that I know are going to happen. One of the things I *know* are know is going to happen is that the world will become both increasingly complex, and if we are to survive, increasingly strong and well-defined at its base. And I want to give readers and listeners here a pathway to participating in that.

Terrific. So, can you tell our listeners where to find out more about you and the things you've been talking about?

Sure. I mean, you certainly can find me on [LinkedIn](#), but, the company is [conexus.com](#).

All right. Well, it's been a pleasure. I love this kind of conversation. So, Eric Daimler, thank you very much for the opportunity to talk about that and find out more about your world.

This has been great, Peter. Thanks for having me.

That's the end of the interview. Really interesting discussion for looking at a broad horizon, I thought.

In today's news ripped from the headlines about AI, Audrey Kim created a temporary exhibition in San Francisco called the Misalignment Museum – go to [misalignmentmuseum.com](#) for tickets – and “imagines a post-apocalyptic world where AGI has already destroyed most of humanity, then realizing this was bad, created this museum as a memorial and apology to the remaining humans.” There's a caption above the hall reading “Sorry for killing most of humanity.” I know, sounds depressing. The site says “We hope to elevate public discourse and understanding of this powerful technology to inspire thoughtful collaboration, appropriate regulatory environment, and progress towards a hopeful, vibrant future.” I'd say that's a noble intent but they're playing with fire in creating something with so much potential to make people more depressed than hopeful. If my speaking about existential issues has shown anything, it's that people weight the dystopian projections at least ten times as much as the utopian ones. Plus if you want to encourage hope, having a sign above the entrance saying “Abandon all hope ye who enter here” doesn't exactly send that message. But we can look at this as anthropologists studying the human condition and say, let's look at this more like art and less like a documentary from the future, and ask what's going on in our collective minds that caused this to emerge? Clearly the conversation about existential risk is reaching a whole 'nother group of people from the ones who were studying it a few years ago, and in general, that's a good thing. More about the anxiety that some of this conversation is creating in a few weeks.

Next week, my guest will be the legendary car designer Frank Stephenson, named by Motor Trend Magazine as “one of the most influential automotive designers of our time,” designer of the BMW Mini

and many models for Maserati, Ferrari, Lancia, Fiat, and McLaren. What is a car designer doing with AI? Find out next week, on *AI and You*.

Until then, remember: no matter how much computers learn how to do, it's how we come together as *humans* that matters.

<http://aiandyou.net>