



# 2026 GLOBAL CONFERENCE

## LEADING IN A NEW ERA



# THINGS THAT WILL BLOW YOUR MIND

**Announcer** 00:01:04

Please welcome the panel on “Things That Will Blow Your Mind,” moderated by Richard Sandler, executive vice president, Milken Family Foundation.

**Richard Sandler** 00:01:19

Good morning. It's once again my privilege on the third day of the Milken Conference to welcome you to what I think is always a very stimulating and interesting session, “Things That Will Blow Your Mind.” I believe on this stage, maybe 10, 12 years ago, we introduced AI when nobody talked about it as AI, with the innovative IBM Watson. Now, those two letters are probably the most repeated letters at the conference this year. And this morning, we're again going to be introduced to these individuals who are all doing extraordinary work using cutting-edge technologies as they are trying to solve our problems of our lives, to make our lives better, and let us live in ways that we probably couldn't even imagine when IBM Watson came out. So let me quickly introduce you to our panelists. You should be reading more about them in your materials because each of their biographies is extremely interesting. So sitting right next to me here is Geoffrey von Maltzahn. He's the co-founder and CEO of Lila Sciences, which you're going to hear about. A company whose mission is to build scientific super intelligence to solve humankind's greatest challenges across life, chemical, and material sciences, using that same scientific method that we all hopefully learned back when we were in school. On the far end there is Dr. Ali Agha, co-founder and CEO of FieldAI, which focuses on developing next-generation robotic autonomy, embodied AI in complex and off-road environments. The good news is he's going to explain to us in a few minutes what all that means. The bad news is you're still not going to understand it when he gets done. Sitting next to Geoff here is Ben Levinson, the founder and CEO of Heven AeroTech, which is developing and manufacturing the next generation of autonomous drones. And he will tell us what he's doing and focusing on the problems of endurance and resilience of drones. And Erin Blanton is the chief operating officer of Carbon Mapper. It's a not-for-profit organization whose mission is to drive greenhouse gas emission reductions by mapping methane and carbon dioxide emissions and leaks anywhere in the planet using satellite technology and

making that data accessible and actionable. So with that introduction, Geoff, we're going to let you start. Tell us what you're doing at Lila, and is it different than IBM Watson?

**Geoffrey von Maltzahn** 00:04:25

First of all, it's a pleasure to be here. I'm going to rewind the clock by 20 years for a moment and then give you a few junctures in between. Twenty-plus years ago, I was an undergraduate at MIT, and the best mentor that I can depict at the time described to me what has become the best guiding light in the many years since. He described that science has effectively been a guessing game thus far, but that during our lives, it would become something wildly different. During my PhD between Harvard and MIT, I concluded something that I'm sure is self-evident to you—that if that's true, then at the time of that transformation, it's almost a given that some or many of the most impactful companies and most valuable companies in all of science won't have yet begun, in that so often, greatness requires defining every aspect of what you're doing around those new rules. So our technical team that formed Lila has been applying generative AI for the past six to eight years in different domains in science. And since Lila began three years ago, people have been frequently asking me variations of, when is the ChatGPT moment for science? And I've described that it's actually structurally not the right aspiration. In that when ChatGPT first emerged, it was wildly fascinating, but it wasn't yet professionally useful unless you're a high school student completing one's homework. It wasn't transforming the field of a professional domain. And therefore, the thing to pursue in the future would be the equivalent of the Kasparov versus Deep Blue moment—that was the first time when machines were better than the best humans in chess. And that transition, where AI models contribute with higher than human-level intelligence to the wheel that we call the scientific method, became our obsession. And we concluded that unless the internet as a training substrate brought science to an end in the best way—meaning all the miracles happen in medicine, every material science revelation takes place, nobody ever needs to run another experiment, which would be magical—but the probability of that occurring is probably approximately zero. Then the internet as a training substrate would be the beginning of the intelligence revolution in science. And if you rewound the internet, all of the most valuable tokens on it—tokens are the atomic unit that AI models are trained on—have come from the scientific method. All of the cures in medicine, flight, all of the things that have transformed society. And therefore, if we fast-forwarded the intelligence revolution, we concluded whomever could automate the scientific method would create a kind of nearly infinite token generator to create the most valuable future tokens upon which to continually train wiser scientific AI models. So three years ago, we began to pursue the simple or seemingly simple endeavor you see on this slide, creating systems where AI models could model the way that the world works in a given scientific domain, propose hypotheses, design experiments, then with the help of robotics automation and real-world instruments, run those experiments, interpret the results, and then update in the middle of the night the model from which the hypothesis came. I said seemingly simple. You have to solve a bunch of really difficult challenges to make that feasible. But we realized that if you map out those challenges and you can solve the general version of them, then you'd create a system that is like a scientific method machine that could be pointed in nearly any direction—i.e., you'd create a system applicable not just to potentially one medicine or a few, or innovations in agriculture or material science, but every one of those fields uses the same scientific method, and therefore one could create a system that might just be applicable to the future of a very broad swath of science.

So two and a half years ago, we built the first lab you could talk to. A lab could think about the experiment that you just run, suggest what you should be doing next. You are going to be seeing many renditions of

organizations pursuing that, and that is a good idea. In the years since, we've transitioned to building the first of what we call AI science factories, where the process of the scientific method can be conceived of in a fully automated factory-like process that could be placed in an arbitrary location, scaled arbitrarily, in that it's not dependent upon a flow of PhDs coming from an elite university, but instead is a central new kind of scientific mind running trillions of concurrent scientific experiments around the clock. Think vast buildings filled with scientific instruments, running scientific cycles of experimentation 24/7. You're now seeing a glimpse of the first instantiations of that in Cambridge, Massachusetts. You're seeing a portion of our AI science factory that can autonomously design and synthesize new DNA molecules, another portion that can do the same for RNA molecules. There's an adjacent portion that has the underpinnings of modern biotechnology—antibodies, enzymes, gene editors, peptides, and others. Just adjacent to this is the capacity to apply this to material science, to discover next-generation innovations for energy, for potential military applications, for carbon capture, and others. And we've come to the conclusion that this is something like the future of all of science. That today we've had to shatter science into thousands of sub-domains and specialties so that our human minds could make progress. And that is a flaw, not a feature. The highest scientific intelligence will almost by necessity be the broadest. So there's a common supposition that whoever has the largest data centers will have the highest form of many or all intelligence here forward. That is incomplete, possibly incorrect in science. Instead, we believe whoever has the largest what we call AI science factory, the largest general autonomous laboratory, will have the highest scientific intelligence on Earth in the domains that that accompanies. The commercial, military, economic implications of that should not be underestimated. This is an absolutely critical race that the world is going to be undertaking over the years in front of us. And I'll give you just a very fast taste of things that we've been doing. This is an example of the benefit of a three-year head start. When you take the internet and dust it off to train an AI model, it's typically about 15 trillion tokens, and of course, only a small subset of that is science. Lila's autonomous science platform to date has now accrued about 10 trillion tokens of AI models reasoning their way to experimental data. By the end of this year, we're going to be at about twice the size of the internet. And even with small subsets of that training substrate, Lila's central model jumps to being the highest intelligence model on the most difficult material science, chemistry, and life benchmarks that we've been able to put in front of this. And we've been applying this central platform of AI, applied AI, software, robotics, automation, real-world instruments, to the kind of domains that you see here. Like the central molecular components of the tree of life, new catalysts for energy applications, nanotechnologies, coatings, and ultra-stable metal compositions, and some of the things below. And I'm going to give you just a couple samples of what this looks like when set in motion. So of course, mRNAs, as you just heard from Noubar Afeyan, co-founder and chair of Moderna, has become an important category of medicine. We wondered whether setting this kind of a mind in motion to play the game of mRNA design might create a superior intelligence for designing such therapeutic models. What you're seeing here is the result of now over 900,000 games, if you will, of AI models designing an mRNA, synthesizing it in the laboratory, testing it in a living system, and then observing the results and feeding that back into the model. This is the duration of expression that takes place in vivo. In both Moderna and BioNTech, the degree to which they're still expressing it a day and a half mirrors what Lila's designs are doing at 15 days. And this is the beginning in our mind of Move 37-esque moments in science, where AI models are making predictions that are puzzling and decisive relative to our best human solutions. And to Moderna and BioNTech's credit, they borrowed the longest known mRNAs expression in all of human biology. This might also be the beginning of AI besting Mother Nature's ingenuity, with her having an extraordinary headstart.

We've also been applying this to material science, as I described. One of our co-founders and our chief autonomous science officer was a Caltech professor, and among his areas of mastery is discovering new

materials that can split water into hydrogen and oxygen. A year ago, Lila's agents were making suggestions that led him to say, "Cool. That's a reasonable suggestion. My lab never tested that, but it's an interpolation between systems that we had analyzed." In about mid-December, he was like, "A third of these don't make any sense. There's no reason to believe this crystal structure or this root architecture would play a role in this reaction." And one of that family is now, as far as we know, humankind's highest-performing catalyst for that reaction that doesn't have a precious metal. The AI's been able to find earth-abundant compositions that can emulate something that has required precious metals to date. We're also applying this to a geopolitically important challenge of finding permanent magnets without critical minerals dependencies. We had a small team discover binders for every protein on the surface of every cell in every part of your body recently. That's never been possible previously in the history of biotechnology. They were able to spool up 1,000 or so agents with which to do so in a short period of time. And as I'm sure is going to be a common theme across things that we're working on, a meme in AI is that this is the least intelligent that the model will ever be. So I believe we're at the beginning of an extraordinary, exciting, and incredibly important new era of science. Thank you all.

**Richard Sandler** 00:15:46

Thank you. So while you're trying to digest where this could lead and the great, really, discoveries that are in our future, let's hear from you, Ali, about how you're going to basically changing our lives through really making everything safer, better, quicker, and easier.

**Ali Agha** 00:16:14

Yeah. You all have heard of and seen the incredible impact of conversational AI, digital AI, like ChatGPT. That contributes and represents roughly 3 percent of the GDP of the world. Almost all of the rest is physical AI. It's one thing to generate next word and next sentence. It's totally another thing to generate actions in the world, pick up a drill, do actual work. That's what we do in FieldAI. We are defining the future of the work, and similar to ChatGPT, we are building models, AI models, that not only just generate the next word, but they generate the actions. Where a moving machine go to right to left, what they do in the environment. We are doing that by building a brain that can go on any moving machine, very agnostic to the platform, that can operate in different environments, and that can do a variety of different tasks. A very generalizable foundation model for the physical world. Robots like a small dog, 10-pound platform, operating around people, all the way to humanoids, to passenger-size and multi-ton platforms. Today, we are deployed across three continents and expanding our deployments in production level. The services that these systems offer can be categorized in these four high-level categories. Tasks that you perform by observing and looking at the world. Inspection, security, progress monitoring, interacting with the systems and people. Second category is mobilizing. Carrying material with large trucks all the way to tools with the small dog robots and humanoids. Third category is modification. You use hands and fingers, pick up something, open a door, press a keypad. And the last one is coordination across a heterogeneous set of agents. A humanoid here, a dog robot at a different level of a construction building, a truck outside, a drone flying. How the same brain manages the coordination across these. These are the types of classes of the services these systems are providing today to a variety of customers across the world. And a key in deploying these solutions and what we are pushing at FieldAI is to enable deploying them in minutes, very

quickly, very rapidly. These systems are—maybe we can reduce that—these systems are introduced to the site, and this is key, like an intern, like a human. Very quickly, you don't need connectivity, you don't need to provide Wi-Fi or 5G. Everything is on the edge, on the robot. You don't need to go pre-map the world. You don't need to define a predefined trajectory and say, "Hey, follow this." Or you don't need to provide GPS. You can go indoor, outdoor. All you say is talk to the platform and say, "Hey, from where you started, go create digital twin, a copy of this world, 200-meter radius around you. Pick up all of the drills around you, put them in this drawer. Open all the doors, close all the valves." And the system reacts to it like you add a new colleague to the workforce.

And we do this in three layers of AI. The chart here shows how we are growing from ChatGPT and conversational AI to generative, perceptive, agentic. And once you pass agentic, now you're starting to touch the physical world. So I'll walk you through these three layers and tell you what we are building in these three layers. The lowest layer is what we call physical layer of AI. This is where you take a very cost-affordable platform like this \$2,000, \$3,000 robot that used to be a million dollar only a decade ago, right? And you make up for the weakness of the body with a better, more sophisticated brain that extracts all this hardware was able to do for many years, but it wasn't generating ROI because somebody had to follow and joystick this. Now the brain actually extract all of that behavior without human-in-the-loop from these vehicles. Like what you're looking at, that was a platform that can carry 150 pounds for six hours for a single charge. All the way going to humanoids that are performing pretty general-purpose tasks across different industries, across different environments based on just a simple prompt that, "Hey, pick up all these tools and open these doors. Put this tool on a different mobile platform to carry across the environment." And we are now pushing it also to humanoids that are one of the interesting form factors, because the world is built for humans, so they can unlock a bigger chunk of this massive TAM in the physical AI, which is based on Jensen, Elon, a lot of people. This is the largest market ever in human history. And unlocking this will basically augment a lot of tasks that are being done in the environments. So you see here highly dexterous operations. This is the key. Done by a robot that is very cost-affordable. So that's the difference. You're not looking at a million-dollar robot or half-a-million dollar robot. Each gripper hand is \$300, single dollar. The body is \$10 to \$15K, and the hardware is getting even more and more commoditized. So more and more companies come in from all around the world building different bodies, and this pushes their focus on the brain side, on the software side, to extract all we can get from these platforms and change how the society operates and how these augment and come to our lives. Second level is operational AI.

So first layer, we talked about the skills, local skills. In operational AI layer, you embed them into the customer workflow. You provide ROI for the customer. This is where you introduce the systems without any map, any GPS, any pre-routes. Everything you see here from customer deployments from Hokkaido, north of Japan in the snow, all the way to deserts in Dubai, to Europe, to North America. And exact same brain, this is the key. Not a single line of code changes. Exact same brain doing a variety of different tasks in different environments. From telepresence to visually document your site, to performing perimeter security. And so here you're going to see a real-world burglary detection. Not our employee, not a customer. Its system goes, detects every night, calls the police. In a construction site, builds digital twins to a millimeter accuracy. In data center, compares these to the BIM model and says, "Hey, this is deviated. You're going to slip in the schedule by three months if you don't catch this error." Transports material, does manipulation, goes on a variety of different vehicles. But the magic of building a ChatGPT-like brain that operates across different vehicles, different environments, unlocks a massive, massive tab. And this can go on radically different vehicles like the ones you see here. Very large platforms. This perhaps—the highest level of autonomy ever in human history, because in the operation you're looking at here, all a

sponsor gives us is a single waypoint. They tell us from where you start, there's this flag we have put relative to where you start, 10 miles north, 20 miles east. Go hit it. They don't give us satellite imagery, no map, no GPS. In many cases, there are no roads. We have to drive over ditches, vegetation. But to show how capable these models can get and how much of the environment you can understand, in the last run we did with this platform, we went roughly 40 miles, no human touch. And there was a baseline human to try same course, and the platform showed, in many elements of the course, showed superhuman performance. You will see it right here. There's a 55-degree slope. Human driver actually slid backwards in the first attempt. Autonomy understood, I need to go back, gain enough momentum to handle this V ditch, and on this slope, I need to do it, this zigzag maneuver, to keep the stability of the system. But they're starting to do better than some of the best drivers can do out there in such complex environments, and the applications are limitless, from mining to construction to midstream pipeline inspection, oil and gas, to being a mothership for other smaller platforms to do transmission line inspection and so on.

And finally, the last layer, which probably most important one, is the multi-agent coordination. It's one thing to have brain for these platforms. The other thing is to have, like a human team, these platforms coordinate with each other autonomously. And what you're looking at here, we sent 11 robots, four of them with legs walking, four of them with wheels roving, and three of them flying. They go into millions of square feet of environment that they have never seen before. We have never seen before as well. So we have never been in these. All the cameras recorded. These are customer cameras and sponsor cameras, and we only see the results after operation is done. So they go in, they build digital twins, finds all sorts of anomalies, threats. This is an operation ahead of first responders. They go in, they discover, they have a limited time, less than an hour, to go cover these millions of square feet and provide all sorts of information. And they make the coordination decisions among themselves autonomously. They see a vertical shaft, they say, "Oh, here's the time for drone." You take off, you figure out what is there, come back, the drone lands on the ground, robot charges it. Here is stairs and boulders. The legged robot, big sister, big brother, you go handle that part, come back. They find each other, come at the rendezvous point. You see it here, robot two and three are talking to each other, sharing information. Robot one doesn't care. Find a path between them and continues. But that level of coordination happens without a human being in the loop and them understanding how they coordinate. But we are scratching the surface. As I mentioned, this is largest market and TAM ever in human history. And as we unlock this, we believe we are going to bring, and the whole robotics community, bring prosperity to the world because now you're doing a lot of work that are dangerous for people. You're making sure we have abundance on food, we have abundance on construction, we have abundance on variety of things that today we have severe labor shortages for. But thank you.

**Richard Sandler** 00:27:35

So that was Ali talking about the multi-agent robots and the different operations. You're really in the flying robot business, aren't you, Ben?

**Bentzion Levinson** 00:27:44

Yeah. Mm-hmm.

**Richard Sandler** 00:27:44

Tell us a little bit about—we're hearing a lot about drones, especially militarily. Tell us what are drones, what don't we know about them, and—

**Bentzion Levinson** 00:27:53

—Yeah—

**Richard Sandler** 00:27:53

—How are you doing using AI?

**Bentzion Levinson** 00:27:56

Good morning, everyone. Pleasure to be here. So as Richard said, drones have become a significant part of the conversation. We're going to do a little glimpse into the world of drones, but before we do so, why are drones important? So as we're sitting today, there's an active war in the Middle East, about 10 countries, ballistic missiles flying in between. We also have an active war in Europe. There's over a million soldiers that died on the ground in Europe over the past couple years, four years. This is not World War II. This is today. And of course, we have the tensions with China. President Xi Jinping of China told his forces to be ready to conquer Taiwan by 2027. We all hope that's not going to happen, but that's the world that we live in. What are we seeing from these battlefields? We're seeing that 90 percent of the casualties on the ground in Europe are coming from drones. To understand the significance of this, this asset class of drones wasn't available as far as 10 years ago. Some would say that's more significant jump from a horse and buggy to a motorized vehicle, because it's a whole new way of waging war. And of course, with that comes a new level of scale and pricing. So the battlefield is changing significantly, and what we can do on the battlefield is changing. So quick history of drones. About 45, 50 years ago, the first unmanned aerial vehicle came out. The bigger drone you see on the screen cost north of \$200 million, taking a jet, making it unmanned. Over the past 10, 15 years, came a new generation of flying cameras, very small drones that can do a variety of things, but they're really taking pictures, and that's what they're doing. What we believe at Heven is that the next frontier in the drone world is actually flying robots, drones that can do real things, be highly scalable, relatively cheap, and change the way we live. But as we started solving this problem seven years ago, we realized that the energy is the key challenge here. These small drones that you saw use simple batteries, which are great, but the energy density of batteries only enables a flight of, let's say, one hour to two hours. The very large UAVs use a combustion or jet-powered engine, the traditional engines that we know. These can power drones to fly for many hours, but they have a significant noise level, they have a significant heat thermal signature, and you have to start getting your fuel around the world. What this means is that if we want to build flying robots that can fly for many hours, complete a variety of missions, lift heavy payloads, we have to solve the energy source. And that's

how we got the hydrogen fuel cells. Hydrogen fuel cells is basically an electric drone, but we're creating the electricity in the sky, and the outcome is flying with no noise, with no thermal signature, and we're able to create the hydrogen at the point of origin. This leads to over a 10-hour flight, over 1,000 kilometers endurance, that's about 600 miles, and undetected. If you see on the screen that small refueling station, that's a trailer. You can pull up by any pickup truck or Hummer. On the rooftop, it opens up to solar panels, and as long as you have this with you anywhere in the world, you can create your own hydrogen. What this means for the defense industry is that you can be deployed anywhere, and for years and years, all you need, you're creating by yourself.

So drones and flying robots, what are the different use cases that can be done? So the beauty about drones is that these are platforms that can do any mission. We are starting off in the defense industry. Many evolutions start off in defense technologies like GPS. But we also feel very strongly that if we have a chance to help our war fighters, keep them a bit further from harm's way, that's our duty. So starting off in defense, things like logistics, being able to drop blood in the battlefield for injured soldiers, and of course, different levels of launching capabilities of drones. We used to need a F-35 jet to be able to take out a target. We can now have drones that are doing this. Taking it one step further, homeland security, natural disasters, all these use cases are starting and will start, will continue to be revolutionized by flying robots. And then, of course, we're getting to the commercial world. We'll see drones at scale first in the industrial use cases where the value is higher, replacing a helicopter, for example, but there's also less regulatory challenges. One of the biggest challenges in drones is, well, what happens if there's 10,000 drones flying above LA today in a shared airspace? Who's controlling this? Who makes sure they don't crash, et cetera? So being able to start in defense where the highest value is saving lives, continue to homeland security, continue to industrial use cases, and then we will see this all around our lives. So we touched a bit on the world of drones and what we're doing to enable drones to be flying robots. Well, imagine you're sitting in your car, you're driving, you have Waze open, but there's no GPS. I think we've all experienced that where left or right, it tells you left, but it doesn't know where you are. In the world of drones, which are autonomous systems, it's even worse because if the drone doesn't know where it is, or if you can't communicate with the drone, then it's basically irrelevant.

Now, as we at Heven have been pushing the boundaries on flying longer distance and harder-to-get areas, in most of the environments, there is no GPS because in defense worlds, there is no GPS, it's jammed, and communication becomes very challenging. And even if we have satellite communication like Starlink, that has a signature. So if we want our drones to be stealth and fly long distances, we need to find a way of communication. We at Heven launched a partnership with a company called IonQ, the largest quantum company in the world today, to solve communication and navigation with quantum technologies. Not yet quantum computing, but quantum sensors and quantum networking technologies, which work anywhere in the world and are undetected. Once we have that, we can really start introducing the world of autonomy and AI into drones. There's multiple levels of AI and autonomy in drones. The basic level is the flight path, so we want the drones to fly autonomously. And the second level is the mission profile. So if our mission is you have to go deliver 100 pounds of a package in the battlefield, well, find the best place to drop the package, find the best place to do that. That's all going to be happening from AI and autonomy. And then, of course, the future is having swarms of these drones. So let's imagine 10 and then 100, and then 100,000, and then a million drones that are flying around all flying autonomously, part of one big picture. So all of this is great, but the big challenge we have today in the US and the Western world is the ability to actually build these drones. So if we look at the industrial base today, we have Tesla building cars, we have Boeing building about one or two planes a day, and drones are kind of in between, because these are flying systems. We have to get to the quality of flying systems, but also get to the scale of cars. We

want to get to thousands a day of these systems. If you also look at it from the geopolitical level, China builds 90 percent of the world's drones. China builds about 100 times the amount of drones the US is building and also controls the supply chain. So we at Heven have envisioned and launched a solution where we launched a mega factory, a gigafactory for drones to be able to build these drones at scale. We're never going to get in the US to the labor cost of China, but we can definitely get to high automation, but also making sure there's a very strong innovation center, whether it's hydrogen, AI, quantum, being able to have this in one center and continue to evolve this. And we have a plan to launch 10 of these facilities with the US government and other governments around the world over the next few years. So quickly about Heven. I founded Heven about seven years ago. Today, we're over 150 employees. And we're honored to be the only drone that's approved today for the US government that's long-endurance stealth. We have many customers around the world, but that, I would say, is our claim to fame, and we're continuing to push the evolution of that. Just to summarize, hopefully, I convinced you that drones are important and it's happening. It doesn't matter what we, as the West, we, as the US, want to do. Our adversaries are implementing drones. And we at Heven are trying to be at the epicenter of that ecosystem, understanding that energy is critical for these systems to work at scale, quantum, AI, and of course, the ability to manufacture. Thank you.

**Richard Sandler** 00:36:39

Thank you. So Erin, while they are doing all these incredible things, you're trying to protect the environment in which we live.

**Erin Blanton** 0:36:49

Yeah.

**Richard Sandler** 00:36:49

Okay. To make sure that all the energy that they're going to be using, okay, and how are we going to protect ourselves. So tell us what you're doing. I know you're using AI also at Carbon Mapper, and what are you doing? How do you measure and how do you distribute the data, and what do people do with the data once they get it?

**Erin Blanton** 00:37:11

All right. I'm happy to tell you about that. So thank you for giving me the opportunity to present today about how we are seeing the invisible in our work at Carbon Mapper. And what my goal is in the next few minutes is to explain to you that methane emissions, which we think of as sort of abstract and all over, are really able to be local. We can pinpoint them. They're visible to us now, and the most awesome part of it is that they're fixable. And so we are working on a problem that has solutions that we know about. And so

that's what makes it so exciting and so impactful. I want to first talk a little bit about Carbon Mapper. As Richard said, we are a nonprofit. We're funded by philanthropy. We're scientifically based, and this is an example. This is our data portal. This is how we interface with our stakeholders. This data portal is available to everyone, so I could do an Oprah moment and be like, "You have access, you have access. Everyone has access. Under your chair, you all have access." So you just have to register. It's free. All of our data is free. It's always available within 30 days. In some cases, it can be available within 72 hours. So we are trying to shine a light on this problem, and we are doing it in a very transparent way. And I just want to give an example about when I said the local piece, which is you can see here, this is a mapping of what we're seeing at a global level. But then if I'm interested in this landfill in California, you can see exactly how we've been tracking that on these various dates to see when this emission event started and what the measurements are on these, going back to when we first started to spot it. So this is an example of really the detail that we're able to get through our observations so that these various people are able to do something and mitigate it. I want to just quickly say, why are we focused on methane? It contributes a third to global warming. It's a very, very potent greenhouse gas. It's 80 times more potent than CO<sub>2</sub> in terms of its global warming potential, but it also removes itself out of our atmosphere very quickly compared to CO<sub>2</sub>. So within 12 years compared to hundreds, even thousands for carbon dioxide. So if we really want to tackle climate change fast, and we want to have a significant impact, cutting methane emissions is a key piece to do that. And I'll show you a little bit, but it also has all the other co-benefits, public safety, public health, and energy co-benefits. Because if we're going to power all of these things with AI, the more methane we can keep in our system, the more we can use it for actual energy use rather than let it go off into the atmosphere. So we look at what we call super emitter events, which are really large releases of methane emissions. That's what our plumes are generally tracking. They make up a disproportionate number of the emissions globally. I'm just going to play a video because I think it's a great video. It was made by my colleague, Jordan. It's only a minute, so don't worry, it's not too long, but it gives a good overview.

**Jordan Giaconia** (via video) 00:40:45

Reducing fugitive methane emissions is one of the fastest, most cost-effective ways to slow near-term warming, and there's a meaningful opportunity right in front of us, super emitters. Super emitters are large but localized methane sources, and advanced observational data is revealing more about them than ever before. They occur across oil and gas, waste, coal, and agricultural sectors. They can be persistent, lasting for days, weeks, months, or even years, adding up to massive emissions totals. And they can represent a disproportionate share of emissions at the city, regional, basin, or even national level. Carbon Mapper insights are designed to pinpoint super emitters and provide the kind of analysis decision-makers need to see exactly where the biggest opportunities exist and to address them quickly, efficiently, and effectively. The super emitter opportunity is here, the tools are here, and the time to act is now. Join us, and together, we can tackle methane where it matters most.

**Erin Blanton** 00:41:45

So that gives an example. Why are we targeting these large events? Because we want to have impact quickly, and they're a disproportionate amount of emissions, so really tackling them is the key. So we've

made the invisible visible, but I want to show you some of the metrics of what we've done to date. We have mapped 37,000 of these super emitting events to date. We have 75,000 active users of our portal. That means they are frequently coming back and pulling our data, and we are reaching 187 countries to date. And our data comes both from aircraft and utilizing satellite, and that's taking imagery spectrography—sorry, excuse me—and then using that to go to that point level and source level, so you can see the facilities and the infrastructure that are producing those emissions. And an example of how we're doing that in this state of California is working with the California Air Resources Board. For the last year, we've had a program that we've provided data so they could notify 113 operators of these emission events, and 31 have been mitigated within just this last year. So this is an example. We're not just putting out this public data. We're actually working with stakeholders to make sure that we're seeing these emission events resolved. And we've done this through really a collaboration with Caltech JPL and also with Planet Labs. So we're incorporating industry, academia, philanthropy, and our work. We added our own satellite, Tanager-1, in August of 2024. We have another satellite going up later this year, two more next year, and so we're continuing to add to our capabilities to continue to map at a more frequent basis with more satellites. And that gives us more data in which we can continue to do those action and have impact. And so who are we working with? So we have four key buckets of stakeholders. We have operators, and we've partnered with OGCI, which is a collaboration of oil and gas companies, to help inform operators of leaks so they can fix them. We have governments that we work with. The government of Brazil is a great example. We've also, on the state level, I mentioned California, but Colorado is another one. Even states such as Texas and North Dakota use our data because of those other benefits like worker safety, public health. These are important to all of us. So we're working with different governments around the world and in different states. And then communities as well use our data. I'm going to give an example of that on the next slide. And of course, researchers and academics who are trying to better understand where do emissions come from, and then also how can we get a better sense of the quantify emissions from various different sources and facilities.

So this was the example I gave of how public health factors in, because when methane is produced, usually there is a co-emission of other gases. Benzene is one of them. This is from an event in 2021 that happened in Adams County, Colorado, and it was at a gas production facility, and it produced a very unhealthy level of benzene. And PSE was able to show through their mapping that this was occurring, and it was happening in a town that had about 3,500 people, had an elementary school, had a daycare there, and they were able to see, here are the risks to this community from this event. So again, it's not just the climate that we're shedding a light on, it's also what's the impact to your local community. That's again an example of the local element to this. And so what's exciting is we've all been discussing how fast these technologies are evolving. We are now, and we just made an announcement last week, we are actually expanding both our aerial and satellite capability. We will have a next-generation satellite and aerial technology 2027 for the aerial and by earliest 2028 for the satellite that will have five times the capability of our current Tanager satellites. And that means we'll be able to see five times as much with two times the level of accuracy. That will, for example, give us not only more data at higher frequency, but able to see areas like agriculture, which has been pretty hard to map and get a great understanding in that sector, and it's a large part of methane emissions, a large contributor. So we're going to have greater visibility into those and only within a couple of years. So just an amazing amount of progress that's happening, and exciting opportunities for us. And so now that we know how to see them, we're going to go and try to fix them. So thank you for letting me—

**Richard Sandler** 00:47:07

—So one of the last things Erin talked about was impact—the impact of what you're doing, and I'm thinking about the impact of what you're all doing. So there is a few things you do have in common that I thought about as I was preparing for this. So you have Ali, you have these robots that are navigating disaster zones alone. Your satellites are autonomously identifying polluters. Your drones are flying their own missions. You're doing experiments through machines. Every single thing that you guys are doing are making consequential decisions without humans involved. All right? So as we think about not only the great benefits to society, what are the things that we should be concerned about or that you hear we're concerned about from others that we shouldn't be concerned about in this autonomous age that we're going? So, I'll start with you and anybody else can go ahead pick up. Geoff, what do you think?

**Geoffrey von Maltzahn** 00:48:05

Well, I'll start with the obvious, implicit one, which is what happens to human jobs in the face of new intelligence entering every single profession?

**Richard Sandler** 00:48:14

I mean, could one of these machines, could they moderate a panel?

**Geoffrey von Maltzahn** 00:48:18

Never.

**Richard Sandler** 00:48:18

Oh, never mind. This is not about me.

**Erin Blanton** 00:48:21

Oh, but, it could.

**Geoffrey von Maltzahn** 00:48:23

There are humorous instantiations of notable people saying, "The following jobs are going to be erased." And then later in an interview they're asked, "What about your job?" And they're like, "Well, AI could never moderate." Or analogs. So I'll specifically focus on science. Intelligence is the determinant of ROI in science. Every frontier of scientific discovery is rate-limited by our intelligence. And of course, our intelligence is what distinguishes human science from the rest of the animal kingdom science. The TAM of the rest of the animal kingdom science, zero. Humans are \$10 trillion or so. So if intelligence goes up a little bit or a lot, we should expect a gigantic expansion of the scale of science. Science's job is to reach into the future and pull out inventions that are a second away, a year away. And what happened in chess and Go as AI models became wildly superior to humans as they reached what might have been thousands of years into the future and pulled out human status quo advances that might have sat in the intervening space. So I don't fear job erasure in science in that the scale of science is going to increase so rapidly as intelligence and return on investment goes up, that we're going to need more human scientists, more infrastructure to support a new body for science. And I think that will outpace the countervailing force for a meaningful period of time.

**Richard Sandler** 00:50:03

So, alright. So Ali, there are probably jobs today, you and I have talked about this, that we need more people in those areas, and some of them are not simple jobs, that the AI-driven machine that you're talking about might help us. What are your thoughts in that area?

**Ali Agha** 00:50:22

You know, absolutely. What we are hearing from industry, from our customers, I'll give you one concrete example. One of our customers, just one, only in one region, Gulf of Mexico, predicting near 30,000, 40,000 labor shortage in the next five years. Especially when it comes to DDD, dirty, dull, dangerous sort of environments like construction and mining and energy and infrastructure, the labor shortage is very, very severe. We took a robot from a data center for two to three weeks off of the data center that it was operating, just for certain other reasons, we needed it for something else, and you can't imagine how many phone calls we got from people who used to work that job like six, seven hours a day, and robot was doing. And they were like, "When the robot will come back?" They were used to it, and they were doing a lot more creative things behind their spreadsheet. All the data was in their fingertips. Exactly as Jeff said. I think what we see the reality of it is, it is transforming some jobs, but it actually contributing to create a lot more jobs, because things are completed, projects are completed faster. We are doing more and more work with them. And if you look at the history, I mean, historically any sort of disruption and technological, the technology comes, we want or not, right? And I think the key is to train people. We really need to invest, I think, alongside technology on training to be able to use these technologies better to create a lot more jobs than it was there. Like when we switched from horses to cars, yes, some jobs went away, but we had mechanics, we had drivers and so many other things. And I think that's the phase, at least in our field of work, we see that the society is going through.

**Richard Sandler** 00:52:16

So we hear about how we have an aging population here in the US, obviously, Japan even at a greater rate, and there are fewer people to take care of those of us that are living longer than there were 30 or 40 years ago. So I assume that this is another area where in effect, robots can actually step up and help in areas where we need really more talent. It doesn't necessarily have to be—

**Ali Agha** 00:52:45

Aging population is very, very serious. In Japan, you can Google, there's even mandates from government now. Like in construction sector alone, there is this i-Construction 2.0 that mandates that a certain percentage of construction jobs must be automated because there's just no way around it. In Singapore, same in Italy, in Germany. And in addition to aging population also, if you look at the data, the young generation coming to these jobs, there's a lot of challenges. People are not applying to be plumber or electrician and so on. Those jobs are actually suffering these days quite a bit from just not having enough applicants.

**Richard Sandler** 00:53:32

So, I was thinking of one thing you said, Ben, about the 10,000 drones flying over here right now. How is that point? What should I be concerned about?

**Bentzion Levinson** 00:53:44

Great question. So I think the industry is working to figure that out. I think the first challenge and concern in front of us is more of the geopolitical sense, which is, and not to be kind of a war hawk here, but our way of life as we're used to it right here the past 100 years here in the US and the West, it's only possible if we can lead and our values can lead. And I had a senior US general tell me that if we have 10 F-35s or F-22s, the best planes, against 10,000 drones, which are not good at all, there's not enough munition on the aircraft to shoot all them down, right? The scale matters, and to some extent, we're behind. So I think that the first thing that we're going to see is really these technologies scale up. And I think it's really important that we as a nation, we as the West, make sure to lead this and invest in this. And the US government is going through a transformation, a very positive one in this sense. And then I think that when we're going to see millions of drones flying in defense, we're going to learn a lot more about drones to be able to implement that in the commercial world. So I do think it's going to happen. But what's going to be— automation is key, AI is key. If you have 10,000 humans trying to manage 10,000 drones, that's not going to work. That—I can assure you on that. If you can have one centralized AI, and everybody can implement their drone into that, and you connect to the flight paths and everything around that, that all of a sudden is possible. But again, it's a future world, opportunities and challenges, and I think we have to make sure to be thoughtful about it and be ahead of the curve.

**Richard Sandler** 00:55:15

So Erin, as you're hearing what some of your co-panelists here are doing here, I think you probably are thinking about certain benefits in trying to clean up the atmosphere and trying to do it quicker and trying to provide other synergies. I mean, I know you are the only one up here that has involved in a nonprofit, so you're the only one that can say that you really care about everybody else and not about yourself. But in all seriousness, are you coming away with ideas here of really where you can take Carbon Mapper to the next step?

**Erin Blanton** 00:55:50

So we run into capacity issues all the time that I think some of the technologies and the way the problems that the rest of the panel are working on are going to be really helpful to us. For example, we have a good understanding of what we call attribution, right? Where these plumes are coming from. In the US, we generally have a lot of good data sources as to what that infrastructure is, who owns it, who operates it, but there are large parts of the world that we really don't have that visibility into at all. And we see these technologies and AI helping us to sort of get a better understanding, be able to take that and help us with that attribution and identification of what those kinds of facilities are, who owns them, and operates them. And so, I think for us to be able to scale, especially as we're adding additional satellites and capabilities, it's going to be really important to harness that technology. And I would just say for sort of on the field and things like that, there are many situations, where you would much rather send a robot in too. I was talking about the public and worker safety elements. There are a lot of times where these events, you really would rather have a robot going in and dealing with that level of worker risk as well as pollution, than a human. So there could definitely be benefits in terms of the workforce down the road as well by deploying that type of technology.

**Richard Sandler** 00:57:24

Great. So, Ben, you talked a little bit about how many of drones are being manufactured in China today. Next week, President Trump will be meeting with Xi Jinping in China. There's been a lot of conversation also at this conference about the US-China relationship, the idea of trying to dominate the world. Put in perspective, or any one of you could come in, put in perspective the importance of what you're doing vis-a-vis our position in the world, because those that are screaming that we should stop, we shouldn't do this, we should have regulations, probably other parts of the world are not stopping. So, what are some of your thoughts? And both of you guys, because you really deal in these areas a lot.

**Bentzion Levinson** 00:58:11

Yeah. Happy to take the lead. So, as I mentioned, right now China's leading the world in this, and there's reasons behind that. One is because they were behind on other things, right? So as we were focused on the new aircraft, they were focused on the new drones. But also the way the Chinese government is centralized, this was subsidized by the government, right? So if I had to raise private capital and speak to the FAA about approvals to fly, they had one central organization just pushing it all forward, very smartly, right? So I think, China's ahead in many areas, and I think we have to catch up, and that's clear. What I'd

also say is that we all hope for peace, right? That's the number one thing. But we also have to make sure we have strong deterrence. And again, if your adversary has 100 times more than what you have, I don't care how good your technology is, you're irrelevant. So reindustrializing in the US, building at scale, and staying ahead, I think is critical.

**Geoffrey von Maltzahn** 00:59:05

I'll add that I just gave the analogy that the role of science is to reach into the future and grab inventions we don't have access to. If the US falls to a lower scientific intelligence than a rival, it will be like trying to compete economically, militarily, and otherwise against a civilization in the future. That is a terrible imbalance. And on some timescale, I believe this is a determinant of this century's definition of US competitive advantage. So I think it's existential that the US is leading the major frontiers in the intelligence revolution.

**Richard Sandler** 00:59:49

So as we wrap up, as they tell me our time is almost over, we could do this for at least another hour, at least I would like to. But I'm going to ask you all just to give us in a couple of minutes what excites you most about the next three to five years, and what you see in the future. So let's leave it on a high note. Ali, we'll start with you.

**Ali Agha** 01:00:11

I think just the pace of development in AI is incredible. We are at the forefront of AI ourselves, and sometimes I cannot keep up with what happened last month, right? So I think we will see quite a bit of transformation, especially when it comes to the physical side. I think people don't yet realize it. I think they're going to wake up one day, I think in less than two years from now, I would say similar to ChatGPT moment, and they're going to see platforms that they can talk to, and actually they can do things around themselves and help with grocery, with nursing, with a variety of different tasks. And I think it will change how we live, and I think what excites me is back to, again, a little bit connecting to China as well. On the software side, the US still has a lead, and I think we need to widen that gap and then push and lead this category. But I think it will be for a lot of positives. I think it will contribute to the prosperity of the world and quite significantly in the next five years.

**Richard Sandler** 01:01:18

Erin?

**Erin Blanton** 01:01:19

I would say I think that the more we see in terms of my space and the emissions, the more we know, right? The more we're learning. We're often surprised by what we find. We looked at, for example, at a lot of offshore facilities because we can now do that with satellite technology using what's called a glint mode. It used to be you couldn't look at offshore very easily. And we saw that it wasn't actually the oil and gas platforms that were producing the most emissions. It was really when the transfer to the ships to take the fuels off was the main source of emissions. And so that's just an example of we're going to learn so much more, and once we learn, we can start to fix the problem. And in harnessing these AI and these other technologies will only help accelerate that. So I'm very, very excited by what I see as our path for progress going forward. And I really do see this as fixable, so I'm very excited about that.

**Richard Sandler** 01:02:20

Great. Ben?

**Bentzion Levinson** 01:02:21

So a few hundred years ago, 98 percent of us were farmers, right, of humanity. And obviously most of us now are doing jobs using more brains and more convenient with air conditioning. I think the next few years we're going to see the most amazing times in humanity where we'll be able to be continuing to use our brains and spirituality and moving towards a world where we can enjoy, right, whatever that means for everyone. So I think it's the most amazing times. Things are moving fast, incredibly fast. So what I would say is that find a way to get on the ship, whatever that means for you, right? I'm curious to hear what you're thinking about, Richard, in this sense. But find a way to be involved in this, into building the future. These are incredible times.

**Geoffrey von Maltzahn** 01:03:04

And I'll just give a fast depiction of a near-term time advantage that the Lila platform creates that is riveting to me. If any of you have ever invested in a scientific company, you're investing in about 2,000 hours per year of output because PhDs and scientists like weekends and they like to sleep and other positive things. If you move those decisions largely into the realm of agents, you can start to operate 24/7. You roughly multiply that output by four. It's almost 8,000 hours a year. If the intelligent decisions are made 100 times faster or 1,000 times faster because they scale with GPUs, you multiply it by something else. If any of those decisions are above human intelligence, you multiply it by something yet bigger. So we're about to see a bonanza of explosively powerful innovations flow from this phase of science.

**Bentzion Levinson** 01:04:00

Richard, how about yourself? What keeps you excited these days?

**Richard Sandler** 01:04:04

I'm excited about it. There's so many naysayers. We live in a society today where everybody tells you what's wrong and what's going to be wrong. And I like the idea of focusing on what's right and what can we do. We have the ability to put in the guardrails to protect ourselves. But we don't want to stop progress in a way that's going to make everybody's lives better, okay? And maybe a lot of people that can't come to this conference, their lives are going to become a lot better and they're going to be able to be exposed to things that we all like and enjoy to be exposed to. So I'm looking at it as the glass is half full and I'm excited about the future and I thank you all for blowing my mind and I want to thank the panelists for being here.

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