

Peter: ...and they've built machines that can bring in methane, water and electricity, and at the other end comes perfect diamonds, four, six, eight, 10 carat diamonds. It's funny you could say, but it's a perfect diamond. It's not natural. Listen, if you want to add floors, you can, if you can have the exact floors you want and if you want to add color, no problem at all. Then there's beautiful John Ivy design, this beautiful diamond ring that is an entire ring made of diamond. The whole thing is diamond, right? It's, I don't know, tens of carats, it is. We are beginning to see a world of scarcity becoming abundance.

Announcer: Bulletproof Radio, a state of high performance.

Dave: You're listening to Bulletproof Radio with Dave Asprey. Today's cool fact of the day is that the Milky Way's super massive black hole just reached record brightness this year. Now, I didn't know that black holes could actually be bright, but it turns out they can. This one's known as Sagittarius A, it's a behemoth at the center of the galaxy, and it had a light show more brilliant than ever recorded before. At least if you look at it under near infrared wavelengths of light, it's twice as bright as the previous brightest observation.

Dave: Now, it turns out that gas and dust heat up and make light on the way into the black holes, so the brightness was really just that the black hole was probably eating something more than it normally did, but it dimmed by a factor of 75 over just two hours. We don't really know why it's been flaring, but maybe it's because a star just buzzed the hole and well, we're going to know more, but you're saying what does this possibly have to do with biohacking with you? It's this, if we can figure out the rate at which black holes swallow matter, well, we can figure out pretty much anything including maybe how your mitochondria work.

Dave: How long are you going to live? Little things like that. We're talking black holes. I don't know, when I look at the future. This just makes me happy because we're cracking the very fundamental nature of how the universe works in a way that we haven't ever done before and I'm pretty sure that it's because of social media. Okay. Maybe not, but speaking of social media, dave.asprey on Instagram, I just put up a picture of one of my sheep. It was fantastic. You totally want to follow that and I'm going to eat it. Today's guest is a guy who thinks about black holes, probably thinks about surfing black holes to be perfectly honest and is a dear friend and certainly from another planet.

Dave: I'm talking about none other than Peter Diamandis who's been on Bulletproof Radio several times before. I keep having him back on because he's always pushing boundaries, pushing limits. This is the guy who created the first X Prize. The reason we have Virgin Galactic and the reason we have SpaceX today is because of Peter's tireless work to push humanity to the next level and he's taken his model and used it to drive change in our world in a way that is unprecedented for one human to do. I've been working with Peter for the past six or seven years attending his events and when I think, "Yeah, I'm thinking pretty big."

Dave: I'd just hang out with Peter for an hour and go, "Man, there's another level I didn't think about." I want you listening to the show to get some of that futuristic goodness, and just learn how to think. Peter's books are on my shelf, Abundance and Bold, You Think the

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World's Crappy. You look at the incredible shit show that is American Politics. Notice I'm not partisan there. I don't really care who you put in the office. It's a shit show and it's going to be a shit show for the rest of our lives. Actually, that's not true. My life is going to be longer than anyone thinks. Maybe yours too if you read my book.

Dave: Anyhow, Peter is the guy who will tell you in no uncertain terms if you talk to him, which we're doing in the episode today, and if you read his books, you know what, despite all that stuff, there's so much abundance, there's so much cool stuff. Our ability to change the world around us is bigger than it's ever been. You will be inspired by this interview because that's just what Peter walks in, it's inspiration and in the future. Peter, welcome to the show.

Peter: Dave, it's a pleasure to be here pal, and you think about black holes and I do, too. It's like the stars. We're living in a galaxy of 100 billion stars and it used to be thought that we lived in a universe of 100 billion galaxies, but it turns out the latest estimate is two trillion galaxies in our universe. Of course a lot of scientists these days think that we're living in a multiverse of an infinite number of universes. Just try and think about that when you go to sleep.

Dave: Now, when you say that, you have this degree in Molecular Genetics and one in Aerospace Engineering from MIT and an MD from Harvard, you're not exactly talking from a position of a lack of knowledge there, which is profound because you're one of the very, very few advanced engineering people who also is an MD. That mindset changes how you think about everything because you've got the system of life that you understand from the medical doctor side and the system of engineering and how to build things and really how stuff works from the engineering side.

Dave: That combination is incredible and it's led you to do breakthroughs and things like 3D printing and AI and drones and material science and health and energy, but there's something going on in there where you think about the future differently. In fact, your new book... This episode is a sneak, sneak, sneak preview because it comes out in January. Your book that's coming out is called The Future is Faster Than You Think and it's based on the stuff that you've covered in the program that I'm a member of Abundance Digital and Abundance 360 the in person side of that.

Dave: Where for years I've been sharpening my future hat under studying with you and all of those technologies that you've just been digging in, you cover them in your new book. I wanted to use this episode to talk about how you instantiate or how you envision the future and how you apply it to these different domains and maybe share a few nuggets from each of the domains. Does that sound like a good plan?

Peter: Yeah, let's have fun with that because I will say that nobody really understands how fast the future's accelerating. When I'm on stage or I'm in the board rooms of some of the largest companies people are, or to large degree, don't get that the rate at which technology is accelerating is itself accelerating. It is, speaking of, when you go back to black holes, the whole concept of what my business partner and friend Ray Kurzweil calls the singularity is fascinating. Every year, the rate at which computers are getting

faster and everything that uses computation like AI, robotics, 3D printing, synthetic biology, augmented virtual reality, Blockchain, all of these things are accelerating too.

Peter: What we can do, what the average person can do these days is extraordinary and we don't think about it. We don't think about the fact that our cell phone that you... If you just bought a new iPhone and you put the other one in your drawer, the iPhone you just summarily dismissed in your drawer has got more computational power than the defense department had a couple of decades ago. It would be a CIA or KGB secret that they would have killed for if they had it, but we think nothing of it. It's amazing how powerful we are, how much access to capital we have and computational power and knowledge and what we can do with that if it's focused.

Peter: A lot of what you and I talk about Dave, is mindset of empowerment of, yes you can. If you believe you can, you believe you can't, you're probably right. Now, there's these technology tools, because they're so democratized and demonetized meaning they're cheap and they're available to everybody. The amount of invention we're getting is off the charts.

Dave: In The Future is Faster Than You Think, and by the way, thanks for letting me read it ahead of everyone else. You spent the first part of it just saying, it's like the first four chapters, you say like, this is what convergence is and why it's changed things. Then you say, here's how you apply it to these things. We're going to paint a picture of the future here and by the way, chapter nine and 10 are healthcare and longevity. You have an amazing track record of picking the future. Talk to me first, what exactly is convergence the way you're forecasting the future?

Peter: Convergence is the fact that number of different technologies are coming together to reinvent business models. It used to be that you built a better widget and that was what differentiated you, but what we're seeing now is that new companies are coming together when they're combining material science and robotics and machine learning and 3D printing. I'll give you an example. One of the companies I'm bringing to Abundance 360 this year, it's a company of my venture fund, Bull Capital, just invested in is called Relativity Space. If you thought that SpaceX was really cool, which they are, and what they're doing is off the charts. So proud of what Elon and Gwynne Shotwell have built, and you're saying, how can anybody ever top them?

Peter: Jeff Bezos is investing a billion dollars a year with Blue Origin and here comes this company, a young guy named Tim Ellis who had been working at Blue Origin as a young engineer and his co-founder had been at SpaceX get together and they say, "Hey, can we actually 3D print entire rockets?" Here in Los Angeles, a few miles from where I am right now at X Prize headquarters, there is a company called Relativity Space and they have built these large scale 3D printers, the largest in the world that use large robotic arms and new materials and 3D printing technology and machine learning paths. They are actually able to 3D print an entire rocket in two weeks in one machine.

Dave: Not just the engine, the whole rocket?

Peter: It's everything. The nose cone, the flooring, the engine, the engine bell, 95% of the rocket gets 3D printed. Here's the beautiful thing so you can 3D print, these are large scale rockets for launching about 1500 kilograms into orbit and you can 3D print one every two weeks. You can iterate the design. You could print, "Let's make a little change here and a little change here and a little change here." That's convergence. Convergence is this capability now, it's a new business model exists because you're combining the robotics that were available, the 3D printing technology that had been maturing with new materials and new machine learning paths, and ultimately, you get something, a new capability that didn't exist before.

Peter: If you think about autonomous cars, autonomous cars are the convergence of GPS and Google maps and Lidar and radar and AI. It's the convergence of all of these things, these technologies and on their own are epic, are coming together to create that are... The term I use in the book is "Automagical". They make our life automatic and magical minute to minute.

Dave: One of the things that stands out as one of those memories that I will never forget was walking with you through SpaceX and watching them 3D print, just a rocket cone. As an engineer, as a guy, I spent a lot of time in tech just seeing that, this is something so radical, something right out of science fiction, but to see it actually happening in a factory and knowing this is actually going to go to space. You do get an understanding that what would have been, years of casting and hammering and an unreliable result, which is how we've always done it under the government's very slow, very conservative perspective on space and just to walk through and actually see it in person was one of those things where just...

Dave: My jaw dropped and you realize the world's not going to be the same under that. And you're making the case in the future is faster than you think that, hey, it's not just one of these things that there's this big set of technologies that are all feeding off of each other and making stuff that could not exist even 10 years ago just happened and not even expensive.

Peter: A couple of years ago.

Dave: Yeah.

Peter: Every everything is demonetizing meaning it's getting cheaper. Let me give the basics for folks to understand this. I call it the six Ds that whatever you digitize, we're digitizing everything. We're clearly digitizing health with the genetics. We're digitizing manufacturing with 3D printing. We're digitizing photography with digital cameras and you can look at everything. In fact, as an entrepreneur, your job is to try and find something that's not yet digitized and digitize it. It enters slow deceptive growth and deception is the first D. When we were at SpaceX, you saw the Draco engine exhaust cone being 3D printed.

Dave: Yeah.

Peter: It's like, that's interesting. This little part of an engine and then it progresses from deceptive to disruptive. Now we see the entire rocket being 3D printed.

Dave: In just, that was what, three years ago, when I saw that probably?

Peter: Yeah, exactly. It's amazing how rapidly things are going. Then the next D is that we are dematerializing, demonetizing and democratizing. Dematerialization here is, we used to have a giant factory to build an entire rocket and that factory is being dematerialized. It's physically going away and it's becoming ones and zeros in printing past. The factory is dematerialized into this one 3D printer, that by the way, when it's not 3D printing rockets it can 3D print a jet engine or an airplane wing or anything else you've got a design set. You're creating a factory of the future here and then it demonetizes it, much cheaper. There's no labor.

Peter: You don't have a plant you have to invest in and it democratizes it. You could these rockets any place. That six Ds is happening, insane.

Dave: I got to push back a little bit on this democratization component of it. Look, when one rich person makes a factory like that with no employees, how democratic is that versus more autocratic?

Peter: Well, when I defined the democratization, it used to be that the set of skills and the supply chain to create something like that only existed in very unique places. It was in Kazakhstan, in the Soviet Union. It was in certain parts of Houston and certain parts of LA in the United States and now a factory like that, a virtual rocket factory could be stood up any place. If a country wanted to start building rockets, hopefully, for peaceful purposes. That democratization is what I'm speaking about. It's not that everybody's going to have a rocket factory, but as things get cheaper, everybody now starts having access to this.

Dave: It's mobile and accessible, but it doesn't mean that everyone gets a say in it. In fact, it could end up that fewer people have a say in things than they think they do in democracies today.

Peter: We can talk more about that. Let me jump into the next part here, which is the fact that in *The Future is Faster Than You Think*, which I refer to as *Future Faster*. One of the realizations I had is that the rate of technology progress is accelerating. That's not obvious to everybody, but it is a holy shit moment for when I saw how rapidly it's accelerating and so why is it accelerating? First of all, we have more computational power on the planet than ever before. We just saw quantum supremacy from Google this year and we know about quantum supremacy.

Peter: I talk about it in the book where quantum computers would be used for in the future, but it's the notion that more computational power, that by the way is demonetized and democratized. Anyone listening who wanted to could go to Amazon or Azure and spin up a hundred or a thousand processor cores. It's this computational power is no longer available just to the largest companies or just to the universities. Anyone could... Listen,

I can't go and do it myself right now, but I have members of my team who can and do. We have access to all the information on the world and we have more capital than any time ever before.

Peter: We hit all-time capital highs in venture capital in 2017 and 2018 when we do it again in 2019. More crowdfunding, more sovereign wealth funds, so more capital is flowing and the cost of doing stuff is getting cheaper and cheaper and cheaper. You and I both talk about genome sequencing. The first human genome back through NIH about \$3 billion, Craig Venter, about a hundred million dollars. Let's use \$100 million for that number. If you had \$100 million back in 2001 you could sequence one genome. Today the price is approaching a hundred bucks, so \$100 million could give you a million genomes. It's amazing.

Dave: It is amazing.

Peter: All these things are accelerating things. We're living longer and more people are connected on the cloud. We're going from four billion to eight billion people connected on planet earth, which means more people are experimenting and inventing and consuming. It's insane.

Dave: It is insane. I'm thinking back to or we can spin up a thousand cores on AWS. I have a poster over here in my office from the very first shipping pay as you go provision on demand system. It was my baby at a company called Exodus Communications and it was out before we had the name cloud computing and I went to our board. I got \$10 million to build it, but we could only build it for \$10 million because we were a billion-dollar company that ran data centers. I look at how much I would charge someone for really that whole data center provision on demand is what my iPhone has today.

Dave: People would spend their million dollars a month and they could make their capacity to go up and down when they needed it and it was earth shattering at 20 something years ago. This is just an in my adult lifetime and I'm in my 40s and I look at that now and I look at what we can do and you cannot just spin up cores and storage and all that, but there's a whole bunch of other tools, even machine learning tools-

Peter: For free on the cloud.

Dave: Yeah.

Peter: You can go in and use quantum processors for free on the cloud today. Holy cow.

Dave: It is unbelievable.

Peter: It is insane. We don't know how fast the future is going, but it's accelerating and here's the challenge if I could. It's, a lot of people are scared about the future and I think a lot of people are scared about the future because they don't understand where it's going. A lot of what my mission and purpose in life is helping them understand where it is and where it's going so that they can use it to change the world.

Dave: Now, let's talk a little bit about the fear part of this. I am exceptional and excited about the future. I also am looking at running out of top soil in about 60 years as being one of the big limiting factors for people. I know we talked about this a lot. In fact, it's one of the X Prizes that got funded this year. I feel like technology may solve that. In fact, our understanding of how nature systems work will be driven by machine learning and go, "We better do this 10 steps before we thought we would, but we just couldn't see it."

Dave: Let's assume that we get rid of that fear and go back to that question about the democratization means that, maybe technologies won't only be for the big wealthy countries, but it's still going to take a sizable chunk of capital to have rocket printer in your backyard. In the second half of The Future is Faster Than You Think, and this is woven throughout the abundance digital learnings that I've had from you. You talk about another voting as voting with your dollars. It's the future of shopping. If people want control, it's where you spend your dollars is exactly what the system will adjust to do.

Dave: If you only buy organic stuff, they'll quit making nonorganic stuff because no one will buy it. It's real straight forward if that's what you want to do. That's where the control comes from even when we have these big systems everywhere. What are you predicting the future of buying stuff is going to look like? What's not obvious?

Peter: What's not obvious is that a lot of the stuff that you normally buy and that you're advertised to, a lot of that stuff, your AI is going to be buying it for you. I want you to imagine that we do it a little bit right now when we talk to Alexa and we say, "Hey, can you buy something for me?" Or, "Can you order something for me?" I want you to imagine in the future we're all going to have a version of an AI similar to Jarvis, like Iron Man. It's an AI that... Again Alexa and Google Home is the beginning of that. You're going to have an AI that you give permission to listen to every conversation you have, read your emails, look at what you're looking at through your forward looking AR glass lenses, look at your blood chemistries.

Peter: That AI is constantly trying to optimize the world for you, is trying to make your world as I call it, auto magical. As you walk in, it will be automatically adjusting the lights and the temperature if it knows what your mood is, it may want to play different music and it knows that you're running out of certain things in the refrigerator and it will order it for you. It actually can see where you're looking. These AR glasses can understand where you're focused, where your pupils are looking, your intention if you would. If it knows you're looking for a new shirt or new jacket and I'm looking at your jacket, Dave, and I'm saying that's interesting.

Peter: The AI may in fact pop up a window saying, "Would you like one, 899 it could be here tomorrow." I just say yes and it brings it. Retail, becomes available to you all the time depending on where you're looking. Then certain parts of retail I might turn on a surprise and delight feature on my shopping AI in which it will send stuff to me that has a 98% likelihood that I need and I like. Part of this is, who's doing the shopping, is it you or your AI? Part of this is are we going to shopping malls any place, first of all? That has to be an entertaining experience because going there for any other reason is insane.

Peter: Then, the conversation I talk about in the book is in the future I'll put on my VR goggles if I'm looking to go and buy a new suit and I will go into a VR shopping mall so to speak. Everything in there is my size. I have an AI consultant who I'm talking to and I say, "I've got an event going on up in Silicon Valley this Sunday. It's a black tie. I'd like something new. Would you spin up a fashion show for me?" All of a sudden there is a runway with a hundred avatars that look like me walking on the runway wearing a hundred different outfits and I see them walking and I say, "Yeah, that one over there, number 27, I like that."

Peter: Then I all of a sudden I look myself in the mirror in this virtual world and I'm wearing that outfit and I move around, it looks good. I say, "Yeah, I wonder how it looks like with the shoes in my closet." Of course there's a digital twin of everything in my closet and I'm now wearing that pair of shoes. I say, "Yes, that's my outfit. That's what I'd like." And it arrives later that day. It's a shopping experience, which could be social. I get another person in that VR world with me looking at me, shopping with me, but it's efficient and... Yeah, I guess efficient is the word I would use.

Peter: If you want fun, there's other fun things you can do besides going shopping, but you can still do that if you want, but you're not going to drive your car to the mall at least, you'll at least take your autonomous vehicle that will drop you off there.

Dave: All right. At a minimum. All right. Let's say now we're in the future. Assuming that I have a job and I have some money and I want to get the suit, it's going to take very little time to do it. What's it going to do for the cost of the suit?

Peter: Well, the suit first of all is manufactured on demand. Your digital image of your body or digital body file is updated anytime your weight changes. The suit is made perfectly for you. There's no inventory of suits. You don't have 10,000 suits in 42 long that are on in the warehouse someplace because they're manufactured on demand. The whole supply chain gets more efficient and cheaper and it's a suit that is bespoke for you. I'm going to guess, we're reducing the price, at least 50% if not an order of magnitude and at the end of the day the question also becomes in the future, Dave, what's the value of brand? That's going to be a fascinating conversation.

Dave: It is, because I'm looking forward to this because when two companies can 3D print the same clothes for you, then what'll happen is what's happening on Amazon right now where there's a race to essentially no profit whatsoever for companies. In the case of Amazon, they actually just keep all of the profit for themselves that's available and the companies who sell there are making very, very few margins on there. I know, I'm one of the companies who does that, I run one of the companies who does that. I'm just looking at the future where the first person with 3D printers is going to make money for two years.

Dave: The second person with 3D printing clothes, as long as they're identical quality, we won't have what we have today, which is where you go online and you think you're buying something and you get a cheap knock off and you get junk. Then, I'm looking forward to being cheaper.

Peter: This is the process of digitization, dematerialization, demonetization and democratization. We're dematerializing the supply chain and the warehouse and we're demonetizing the cost and then it becomes more available to everybody. This happens over and over and over again on every single, not every single, but most all products. We can talk about this later. I'm a capitalist entrepreneur, I love starting companies, but we're heading towards a post capitalist society some decades out where things become the cost of the materials, the energy and the information set.

Dave: I'm going to make a prediction and I want you to tell me if it's a good one or not. If you're young and you're looking for a sustainable, interesting high value career, become a tailor. You'll be really good at making clothes because when everyone has 3D printing clothes, the person with handmade bespoke clothes is going to be the coolest person and if you're the one who does that, I'm not even kidding. I'm a contrarian at heart, seriously, you put on a 20 on your hat, am I right or am I wrong? When no one else is making clothes and you're the one making clothes, you're going to be the one who wins.

Peter: Now, the question is, can anybody that you know differentiate from a 3D printed exact version of what you're wearing and a bespoke version, and you're going to have to go around telling everybody, "Hey, this is hand tailored. If you want to get the coolest factor."

Dave: I think it's going to be tough when the copies are that identical, it won't matter. It'll probably be because they're less perfect than the robotic ones, but I'm-

Peter: One of my favorite examples of dematerialization, demonetization is a company called Diamond Foundry up in the Bay Area and they've built machines that can bring in methane, water and electricity, and at the other end comes perfect diamonds, four, six, eight, 10 carat diamonds. It's funny you could say, but it's a perfect diamond. It's not natural. Listen, if you want to add floors, you can, if you can have the exact floors you want and if you want to add color, no problem at all. Then there's beautiful John Ivy design, this beautiful diamond ring that is an entire ring made of diamond. The whole thing is diamond, right? It's, I don't know, tens of carats, it is.

Peter: We are beginning to see a world of scarcity becoming abundance. In other words, what do you think of as truly scarce? Energy is not scarce. We live in a world that the earth is bathed in 6,000 times more energy from the sun. May not be in a fully usable form yet, but we're getting there. Time, which is scarce. It's the most scarce thing. We all have 24 hours in a day, seven days in a week, but how we use our time is changing. I'm a private pilot, I save an hour not going to LAX where I can go and fly my own plane out of Santa Monica. I buy back time. The fact that you and I, where are you right now as we're recording this?

Dave: I'm on Vancouver Island looking out at the ocean.

Peter: I'm in Culver city and we would have to record this some time ago, we would have had to spend a day flying to a mutual location and doing this, but I'm having a full experience with you right here digitally and we're saving a good 10 hours and you and I are both

focused on longevity, which is a way we don't make time more efficient that we actually have the potential to add time. Whether it's 10 years, 30 years, 40 years, a hundred years. Technology is taking scarcity into abundance in almost every single area.

Dave: You've actually done a lot of investing and a lot of what you teach at an Abundance Digital and Abundance 360, it is about what's happening in that space. I've had a chance to ask Craig Venter questions because of the events that you put together and I want to know in *The Future is Faster Than You Think*, in your new book, what are you saying now about longevity that you might not have said five years ago?

Peter: What I'm saying is that we are in a magical period of time right now that this next decade we are seeing a dozen different technologies that are in the lab and in testing that we are seeing and beginning to see amazing evidence. I have tremendous confidence that the term I use as a hundred is going to become the new 60 that at a hundred we will have the aesthetics, the cognition and the mobility that we had at 60 and what I speak about is things like, stem cells and synthetic medicines that kill the senile cells in your body and wind pathway cell to cell communications and GDF 11 this is the growth factor out of young blood and just to begin a few.

Peter: Then there's the work of David Sinclair just wrote an amazing book called *Lifespan*. That looks at NAD and NMN and his information theory of aging. Listen, there's enough going on that I would be shocked, absolutely shocked if we didn't take a quantum step forward this next decade.

Dave: All right. It's funny, every one of the technologies you've talked about is in my new book, *Super Human* and people are saying, "Hey Dave, how can you say 180 and the reason I picked 180 is the amount of time that I'm going to live as the floor. At least this long. I don't want people to think I'm crazy if I go even bigger than that, but I'm thinking in the next hundred years, can't we do 50% better than our current best? you and I both know it's exponential. 50 years is a piker, look, that means we didn't do a very good job. That's a losing we innovated like we did in the 1970s. It gave me another couple hundred years realistically.

Peter: 100%.

Dave: Do you see that? I'm going to live to 500 years, what's your number?

Peter: I'll give you my number in a second, which I came up with when I was in medical school, but there's an important point that... What I work with the 3000 entrepreneurs that I mentor through Abundance Digital is to help change your mindset. I want to have folks, first of all go from a scarcity mindset to an abundance mindset, which means listen, stop feeling fearful. There is more and more of everything available and you have to flip your bit on how you see scarcity to abundance and we can talk more about that but once people get, "Yes, okay, I get it. There is more available. I can stop hoarding and protecting and trying to think small."

Peter: The other thing is going from a linear to an exponential mindset and this is the point you're making. In the next 10 years, we're going to create more wealth than we have in the entire past century. In the next 10 years we are going to see a hundred years of technical progress. Even if we just got 10 more years of healthy lifespan, and you and I both talk about health span and vitality. In the next 10 years, we're seeing massive breakthroughs in CRISPR and gene therapy and AI and really understanding how the brain... Beginnings of understanding how the brain is working and what are the genetics of aging and what's the information theory of aging.

Peter: I think we're going to unlock so much potential. If in the next 10 years you unlock only another 10 years, that additional 10 years is likely to give you another 20 years, another 30 years. It's a concept I've talked about before, Aubrey de Grey and Ray Kurzweil talks about longevity escape velocity. It's a beautiful idea, that for every year that you're alive, there's going to be a point at which science is extending your life for more than a year and that diverges beautifully upwards.

Dave: People oftentimes ask me, is this only for rich people and how are we going to have that many people on the planet? What are your answers to those two questions?

Peter: The answer is no, it's not only for rich people. A lot of the treatments that I'm seeing are really cheap. In Dave Sinclair's book Lifespan, he talks about using NMN, which is, on the order of a dollar a tablet, it's affordable. If you drink coffee, it's on the order of a price of coffee.

Dave: They stack well together.

Peter: They stack well together. 1, 3, 7-trimethylxanthine is my drug of choice. That's caffeine as you all know. A lot of these treatments and then stem cells are coming down in price rapidly. All of these things like the wind pathway treatments that companies like Samuel Matt are working on, the cost of the actual treatment is pennies. It's incredible.

Dave: It's coming and it's coming down. In fact, we've been manipulating the wind pathway now for a long time. Some Chinese herbs you can get today that are in Super Human that work exactly on that pathway and funny they're known for making your hair turn brown again. We didn't know how or why we just did a correlative analysis, but I firmly believe that everything that you and I are talking about is going to be available in a village in Africa in 20 years. They'll probably be wealthier in 20 years than it is today, but it'll still probably be less wealthy than a country with more technology, but just that this will become democratized, just like cell phones and sometimes people get mad.

Dave: How can stem cells be like that? Do you believe as I do that all of these are going to become available because demand will call on them?

Peter: Yeah, 100%. One of my companies is a company called Cellularity that preserves stem cells from placentas. 99.99% of all placentas are thrown away at birth, but the placenta is one of the richest sources of stem cells ever. Anyone's pregnant, by the way, rather than just saving your newborn's cord blood, you should truly save the stem cells and the

placenta, which are the most pluripotent. The original boot disk for your child can be reused to regrow an organ in the future and repopulate the child stem cell populations in your body. Google, "How do you save your stem cells or your child's placental stem cells?" It's important. A single placenta can generate millions of dosages of stem cells for therapeutic purposes.

Peter: Yeah, all the stuff in will become lower and lower cost as the demand increases. Let's talk about the population concern that you mentioned. It's interesting. I'm more concerned about under population of planet earth in the future than overpopulation. If you Google Bill Gates and population, he has two great Ted talks and he shows us that you do two things to a city or country. You make them healthier and better educated and the number of children per family plummet. Here are the numbers. 50 years ago, the average was about six children per family on the planet today, globally, globally, the replacement number is 2.1 children per family maintains the current population on planet earth for death rates. The current population growth rate, average children per family has gone from six to 2.42 rapidly plummeted.

Dave: Globally?

Peter: Globally. In the United States, we're at about 1.75, we're below the replacement average in the United States and so we're seeing the number of children per family plummet and we're not replacing it and so we will probably peak at nine, nine and a half billion and then see a rapid decline after that.

Dave: I am also not worried over long periods of time about it because I wrote a book on fertility and our fertility rate is plummeting because of some of the things we've done to ourselves and to the world around us. That in combination with increased health, assuming we continue to increase health and increase the education and more access to just making a decision to have a child instead of letting your biology make the decision without your input. I'm like you, not worried about a population problem over time, although over the next 20, 30 years globally it may be pretty ugly. Just as we keep climbing, slumming more people in when we don't have the tech done.

Dave: Okay, those are the two answers there. Is, bottom line, you and I are in agreement over time we don't have a population problem. We might have a little one now and might get a bit worse, but over time it's a problem that it's self-solving.

Peter: By the way, it's only a problem in the large Metro downtown areas, the Favelas and so forth because there is so much available land on the planet that could be populated. We just don't go there because we don't have schools, we don't have shopping malls, we don't have other things. All of a sudden if those things are available virtually or if there's drone delivery to the Gobi Desert and there's Wi-Fi from Spacemate... One of the things that's happening in the next four years, we're going from half the world connected digitally in 2017 3.8 billion people were on the net in the next six years with the deployment of 5G and one web and Starlink from SpaceX and a number of other satellite constellations.

Peter: We're going to connect 8 billion people on planet earth and they're going to have gigabit connection speeds for near zero cost everywhere on the planet. Mount Everest, the Gobi Desert, you're connected if you want to be.

Dave: There's so much value to be unlocked in that. I got to ask you this, Peter, I've interviewed some really smart people, bioengineering people and all. Looking at the effects on voltage gated calcium channels in mitochondria with different frequencies of electromagnetics and there's concern. Some of it overblown, but some of it, there are studies about a global EMF, stuff like that. What's your take on that? You both have the engineering side and you have the MD side. Is there anything to pay attention to there?

Peter: Listen, I'm sure that there is, I keep on hoping and waiting that the government regulatory systems will be doing the science to test this. I remember back in the late 80s there was a cell phone scare that cell phones at, 900 megahertz and 1.6 gigahertz were going to be causing brain tumors. That scare didn't pan out at least to any knowledge that I know. Now there's the same conversation around 5G, which we're beginning to deploy, is that going to cause problems? The fact is that the body was not made to be bathed in that amount of energy at these spectral areas. I think about it; I have not changed my behavior as a result of that.

Peter: What I do do is I scan myself, you know there's a company called Human Longevity in the Health Nuclears?

Dave: Yeah.

Peter: Every year I go and I digitize myself. Full body MRI, brain MRI, brain vasculature, coronary CT, lung CT, full genome microbiome. I check, is there anything going on inside my body I should know about? Because eventually there will be a yes. We all are developing cancers all the time. It's just our immune systems knock them out, but maybe sometime it would. I want to find it at stage zero and stop it. This is part of the future of longevity is you find disease and you stop it before it takes hold.

Dave: Yeah. That that is the trick. I still have this idea that we are going to figure out, because I have a pulsed EMF device behind me that's used for cancer treatment by some people and-

Peter: [Crosstalk 00:45:15] I love the pulse EMF.

Dave: ...increasing bone density. If it can do good things, I'm pretty sure we can make a communication one that's probably good for our biology, just we haven't done that yet. There's probably an X Prize around that.

Peter: By the way, Dave, I do love your focus on the mitochondria, as the energy source of the body, I think understanding the genetics and the biochemistry of the mitochondria and how to revitalize it, rejuvenate it is fundamental. Congratulations for all that you're doing in that area.

Dave: Thanks Peter. I've found that I had a problem there that needed some serious hacking and more and more research is coming out. Even some that came out after Super Human came out where they just figured out that when the mitochondria make enough ATP that they're actually powering the cytosome so that it can regenerate DNA, not mitochondrial DNA, but nuclear DNA. What's happening now is if you have enough power, then it will go into regenerating your DNA so you don't get DNA mutations that are linked to cancer. If you're running with substandard mitochondria, the body says, "I didn't really have to fix my DNA." Then it doesn't.

Dave: It's so fascinating to me. I always want to ask, when we're looking at these amazing technology futures, is there a dark side, like the destruction of insects by LED lighting? Things like that. LED lighting saves a lot of electricity, but it affected the system of biology in an unforeseen way. How do you account for in your book and your thinking, how do you go for unintended consequences of the technologies that we're deploying?

Peter: There's no question that there is always unintended consequences. Let's look at one of the biggest technology, unintended consequences that exists, which is farming. Farming is a technology and growing livestock is a technology and the unintended consequences has been to deforest much of the planet and turn ourselves into a planet of cows. We don't need to look at LEDs or 5G or cars. We can look back hundreds of years as humans, as we take control and shape the world to meet our needs. There are always unintended consequences the difference now than 20 years ago or a hundred years ago or 500 years ago is we can now begin to measure what's going on.

Peter: We can now be attentive. We are heading into a world of 20 billion connected devices, a trillion sensors. Thousands of satellites imaging the earth, drones imaging the earth, AIs that can connect and process that data and begin to actually give us a feedback loop. That's a beautiful thing for me. While people talk about all the evils of all this technology, hey listen, unless you're an omniscient being, for the first time, all this technology is giving us the ability to truly understand what our impact is and hey, stop doing this and start doing this. Like one of my big areas I'm focused on is as we create a world of abundance, it's not fair to tell people they can't have higher quality protein.

Peter: They can't have tuna or can't have beef or chicken, but we're destroying the planet by the amount of beef we're producing and the amount of tuna we're fishing. I'm working with an another mutual friend of ours, Tony Robbins and the Abu Dhabi government about doing a X Prize on cellular agriculture, feeding the next billion. How do you create a higher quality, healthier, cheaper Wagyu beef and Hamachi tuna? How do you create that? It's, you just take a stem cell from the cow or from the tuna fish and then grow in the lab something that tastes better, is healthier for you and is much cheaper and it's manufactured in downtown Mumbai or downtown Detroit.

Dave: What I appreciate about that, Peter, is that you're delivering a biologically identical end product that will then have that effect on the body. This fake meat, it's plant based, but it tastes like meat. I'm sorry, it's still a potato. You won't have the biological effect of a potato. No matter if it tastes like ice cream, great, but meat does something different to the body. I am also hopeful that the systemic cost of all the growth mediums and all that

is accounted for in our equations. I'm a little bit skeptical that we're going to be able to have a system.

Peter: You're actually right. One of the things we have to work on is a growth medium and how do we engineer new growth mediums that from an energy and pollutant standpoint is better than growing it the way we do right now, which is growing an entire cow to get that one piece of steak.

Dave: Right now I'm still pretty firmly in the mindset that says, the best thing we can do is we can take cows and sheep and goats and put them on land that isn't good for agriculture and don't put too many of them and then they make better soil to make healthier stuff and you can still eat them. You're taking land that wasn't really suitable for agriculture without draining aquifer. Then the environmental equation is very different. If we all eat a little bit less meat, but it's high quality, I think we've got enough space and we can probably suck carbon out of the air that way. In the meantime, if I could get a cell grown steak that was less impactful than that and equally healthy, I think all of us would make that choice.

Dave: It's just, I can't tolerate growing soybeans and corn to make a cow because that's unsustainable from a human biology perspective and an environmental one. We've got to end that. Now, we've talked about a bunch of things and in your book you talk about more and we've mentioned Abundance Digital a few times and if you're new to Bulletproof Radio, you haven't heard my interviews with Peter before, you might not know what this is. I am buying you as a Bulletproof Radio listener a scholarship if you want to be one of the 3000 or so entrepreneurs who are in Abundance Digital. This is a program that I am actually a member of.

Dave: Peter's helped me to shape what I do with Bulletproof and 40 Years of Zen and TrueDark and the other companies that I've founded or that I work with. In order to do that, I'm not receiving any monetary compensation for this other than Peter will send you a copy of my book if you want to sign up for Abundance Digital. Peter, it's abundancedigital.com is that the URL people go to?

Peter: It's abundance.digital is the website and the code, Dave, that we created for any of the listeners here is Bulletproof 40 and that gives you a 40% scholarship from Dave, from Bulletproof. Let me just mention what is Abundance Digital. First of all, it's a community of abundance and exponentially minded entrepreneurs. It's a lot of our graduates from singularity university who are really exponential entrepreneurs. In that community are people who have extraordinary positive attitude about solving the world's biggest problems. The mindset is you want to become a billionaire, help a billion people. The world's biggest problems are the world's biggest business opportunities.

Peter: What we do is, I do four live webinars per month for the community. I have an entire curriculum on exponential energy and medicine and future transportation systems, and I interview and we've created curriculum. It's hundreds and hundreds of videos around AI robotics, 3D printing, synthetic biology, AR, VR, Blockchain, taught in a very understandable fashion with me and the world's experts. You get it all as your membership in the Netflix model. You watch it as much as you want so you can self-

educate. Then we have a digital app in which you can meet and connect with everybody and I'm in the app answering questions. I mentor everybody. It's like, what is your question? What's your business idea?

Peter: How can I help you with your mindset, with your massively transformative purpose? We have meetups in the Abundance Digital community and then every year, as you know, you remember my Abundance 360, which is my CEO summit. It's \$15,000 for the CEO summit. All the Abundance Digital members get three days of live cast. You're in the event live for three days digitally. The Abundance Digital membership is \$1,500 and with this discount of the scholarship you're providing with Bulletproof 40 as the code, it's \$897 and as you mentioned, I will be sending everybody who joins through this Bulletproof 40 code, a copy of Dave's book, Super Human.

Peter: If you have read the book like I have and you have a copy, give it to a friend you love that you want to live longer. Anyway, that's the opportunity.

Dave: You guys, I want you to be really clear on this. You can go to a lot of places and buy this for \$1,500 when you go to Peter's thing and then if it's referred, there's a referral thing. I am giving you the referral. I think this is worth your time. If you like Bulletproof Radio, this is good for you. I am forgoing all of that, handing it back to you because I appreciate you listening to the show and because I think it's worth your time if you're an entrepreneur, if you care about the future, and if you are seeking a community of people like that, it is very lonely to be someone who lives in the future surrounded by people who are stuck in the past.

Dave: This has been a problem for me my entire life starting in probably third grade. I don't know why I'm that way, but I am years ahead of... I don't know, that's what I care about. If you're like that and you're excited by all this stuff and you see that there's amazing things happening and you can see the bridge to get there and you want to be around people like that. That's why I found... Read Game Changers. The value of your community on your happiness and on your performance. This is how I get my community of people who care about the future and don't just care about it because we all care about it; they're actually doing something about it.

Dave: That's why it's my gift to you. It's literally money out of my pocket, but I'm happy to do that for you.

Peter: I love you for that Dave, and it's a hundred percent you're one of the most generous and giving and supportive people that I know and I'm grateful for you in my life.

Dave: Thank you, Peter.

Peter: I hope folks will join it's, abundance.digital and again, Bulletproof 4-0, Bulletproof 40 as the code. What I can promise you is I give that community every relationship, everything I'm working on, copies of my book in advance, access to everybody I think is changing the world. Information about longevity as I learn it. It's my go-to community because in your success as an exponential abundance-minded entrepreneur, you're making the

world a better place. I believe this Dave, and I know you do too, it's entrepreneurs and people who are empowered, who give me the greatest hope to use all of these technologies to make the world constantly better.

Dave: Well, having known you for a long time, having met some people who have become very close friends through the network that you've built, having hung out with Anousheh, who's the CEO of X Prize, who was the first private astronaut woman ever, and just seeing the decades of building the future you've done, I'm happy to be a part of it and happy to bring the Bulletproof Radio community into that and just to talk about it because honestly, who wants to live 180 years if you think the future is either something you can't change or something that's dark?

Dave: It's neither of those. If there's anyone on earth who has just like pointed that out very bluntly and clearly with science behind it, it's you, my friend and thank you for being on the show again and you're always welcome back when you do something new and big.

Peter: Thank you. Congratulations on Super Human and it's I think one of the most important things that you're doing there and I'm your compadre and that is giving people hope about the future. It's hope about the future of their health and longevity and that's extraordinarily important. By the way, if anybody wants a sneak peek of The Future Is Faster Than You Think, the website for that is futurefasterbook.com and you can see what's going to be coming out. The book comes out in January, end of January, but there'll be some incredible advanced purchase giveaways like you can get a copy of Abundance and Bold in addition, if you buy the book Future Faster before it comes out.

Peter: Anyway, I have a mission. I want to brainwash people to be more positive about the future and take action about it. My onstage, it's like stop complaining about the problems in the world. Start fixing them because you can.

Dave: I got to say it, I'm just rafting big food with Bulletproof because I'm tired of junky packaged food that doesn't work for people, so I did something about it. It doesn't have to be a big thing. Just walk around, find something that's annoying to you every day and there's probably a business behind it. It's not that hard, but being surrounded by thousands of people who think the same way, will make it easy for you. That's why I spend my \$15,000 a year to come to your event. That's why I'm a member of Abundance Digital, because I got to have that in my life or it just doesn't work. Thanks Peter. Have a beautiful day. Have a beautiful decade and a beautiful-

Peter: Thank you, Dave.

Dave: ...century coming up here.

Peter: Let's do that, pal. Be well. Love you. Be well.