Welcome back to another episode of Bush School Uncorked. We are gathered again at Downtown Uncorked in downtown Bryan for another live recording with a special guest. Greg is with me, as always, nodding his head, which the audience can't see.

Historic ... We're in historic downtown Bryan.

Historic downtown Bryan, as you remind me. And thanks, as always, to the Bush School for sponsoring.

Today we have a wonderful guest with us, Professor Elizabeth Cobbs and she is going to talk about a new documentary she has coming out, "CyberWork and the American Dream." And I am going to be serving on a panel with her, actually, at the premiere in mid-April and that'll be on April 15th at 6 PM over at the Bush ... That's not the library.

No. It's-

It's at the Presidential Conference Center-

Presidential Conference Center.

In the Hagler Room, I believe.

Hagler Auditorium.

So, Hagler Auditorium. So if you'd like to join us, we'll be there at 6. We'll be watching the movie and then Elizabeth Cobbs and I and a few other panelist members will be discussing the documentary. So if this conversation is interesting to you, we won't cover all the specifics of the documentary, so you should come and join us out on April 15th.

No spoiler alerts.

No spoiler alerts. Well, we'll leave that up to ...

We'll leave that up to Professor Cobbs. And we should say this is the first time that our special guest has been a professor in another department.

It is.

In another college, at Texas A&M.

So now not only are we mass communicating, we are mass communicating across the university.

In an interdisciplinary way.

Ooh, interdisciplinary.

Oh my God.

I bet that's a word the Dean would like.

Profess-

I can't believe I'm the first.

No, Professor Cobbs is a professor of history.

Thanks for joining us. Is it all right if I call you Lisa as we begin?

Yes, you may. I always say, "Call me Elizabeth Cobbs," because I'm an author and so you're always trying to get that old name recognition out. But, no, please, Justin, call me Lisa.

All right.

We're friends.

Aww. That's great. So thanks for being here with us today. I'm really excited to get to see the documentary, I watched the trailer, and this has become a very fascinating topic to me, for my own research. But before we get there, let's give the listeners a little bit of background information on you.

So what brings you ... What's your ... How do you see yourself as a historian and your path towards where you are now? Just a little bit of background.

Yeah, well, you know, I think history's a thing that everybody thinks is boring until they hit 30, about, usually. And then you realize that pretty much everything is this story and it has this backstory that's really fascinating, that you know, makes life interesting. And I think of myself as a full-service historian, by the way, which means that, you know, people like history in different ways. Some people, you know, hate fiction. They're like, "I just want to know the facts." I mean, those are like those serious people, right? And so, you know, I write books, as most professional historians do, for those people who want to, you know, you don't make up a cloud in the sky, everything has to be documented, and you interpret it and you try to understand why something happened, but it's all fact.

But, then there are those other people, which is how I was as a kid, which is, you know, "I want to read history by the pool." And I loved historical fiction, that's how I came to history. So I write novels too. My last non-fiction book, for example, for the straight-up history people was called "The Hello Girls: America's First Women Soldiers." And it was all about, literally, you know, the women who served in World War I, who braved the bombs, who braved the submarines, who answered 26 million phone calls for the U.S. Army, connecting generals with guys in the trenches, because that's how phones worked back then.

So that's straight-up history. But then my next book coming out is a novel, a fictionalized account of Harriet Tubman's Civil War service. Now, by the way, little did I understand I'd be writing about two groups of women, military veterans, who had to fight for decades for their pensions, but that turned out to be the case. So that was true in World War I, it was also true of Harriet Tubman, who got a military pension after 30 years of petitioning because she served as a soldier in World War, pardon me, in the Civil War. So, anyway.

But now we're talking about a documentary because some people don't want to read by the pool and they don't want to read the serious stuff. They just want to watch TV. So I'm like all over that.

Sounds like you're trying to appeal to us Millennials.

Maybe. You said that, I didn't. I don't know, I just think that it's, you know, there's so many different ways that we learn, right? And one thing you can with documentaries that you just, you can't do otherwise is to show the pictures, you know, to hear the words, to hear the songs, to ... In this case, we're talking about artificial intelligence and we started with Frankenstein, you know? And you know, he gets the girl and the girl shrieks. And you know, I mean, that's just fun stuff. So it's another of engaging Americans in history and making it accessible to everybody.

And you're taking another approach today, with us, on our Bush School Uncorked podcast, for people that maybe don't read or don't watch TV. Maybe they will have their earbuds in and listen to us today, so they're getting another mode.

Absolutely. Right. The reason why podcasts have become so important. I mean, more people listen to podcasts than watch television anymore.

I hope our numbers show that.

That'd be nice.

Good luck.

Thank you. So what brought you ... You know, the background of different groups of women fighting for their pensions and serving their country is a little bit different than artificial intelligence. So how did you make this transition from, to think about artificial intelligence and work and automation? Those things seem a little disparate in my mind.

Really?

You're shocked. I can tell.

I'm shocked. I am shocked. Well, I think it's because one of the things I teach here at A&M, which I really love, it's like one of my very favorite classes, is World History. And it's like, you know, 1492 to the present. And I love it because you get to make these big connections between all kinds of things and explain really big stuff. And one of the really big things is, you know, how can we have this podcast, you know? How did, after thousands of years of modern, anatomically modern, human beings hanging around, you know, plowing stuff, did we suddenly, 300 years go, "Oh, oh, gosh. I could've had a bottle of Pellegrino here, which is what I'm having instead of wine. The Dean-

At least while the podcast is going on.

Yes, Greg is the responsible adult in the room.

We need one in the room.

We need one. So I mean, I just think it's really interesting and I always love to talk about, "Why does the Industrial Revolution begin when it does," and, "Why does it begin," again, "where it does," and, "Why does it spread so rapidly to the United States and doesn't to most other post-colonial countries?" For example, the United States is the first post-colonial country, but it takes rapid root in some places and not in others. And so in that sense, it's a part of my kind of full-service historian, you know, persona here. It is different.

And in fact, actually, those, I mentioned two books in kind of women's history, but that's actually new for me too. Previously, my specialty has always been U.S. foreign relations. But that gives me an [foreign language 00:07:24] into all things related to war. So women in World War I, women in the Civil War, does relate in a general way to my specialty.

We're going to be able to speak both Greg and [Eisling 00:07:35], which Greg is the foreign policy expert and I am a aspiring artificial intelligence expert. So we'll be able to speak both of our languages.

Nice.

Yeah. So this documentary is about artificial intelligence, it's about how that's going to affect work, and then there's this bit too, in the title, it's mentioning the American Dream. So tell me what you mean by the American Dream and its potential relationship with these technological advances.

Well, you know, it's like all titles. They're like a series of compromises with producers or editors and you're like, "Well, it could be this, it could be that." But we put on ... We started with sort of "CyberWork" because we were trying to get at, well, actually, because working, because "Tomorrowland" was our other thought, but Disney has everything copyrighted. You cannot use "Tomorrowland." So pardon me for using that word now.

But, so "CyberWork" was our first one and then, you know, the American Dream is related because, for two reasons. One is, what's going to happen to the American Dream, you know? If the robots take over, if two-thirds of jobs go away, what's going to happen? What's happening right now? How do people feel about their prospects as Americans? That's one meaning of the title. But the other meaning of the title is that technology has always been the American Dream, you know?

Mm-hmm (affirmative).

The American, this is where the history comes in, why does the, you know, why does industrialization take such fast root here? And it's because about everything American. It's about the Declaration of Independence. It goes right back to the founding.

It might be useful to talk about some of these terms, because I've been doing, as I mentioned, some research on artificial intelligence and people seem to have like, both in the literature and in popular discussion, people are like on extreme ends of one, what is artificial intelligence, and two, what are the range of potential possibilities that it has. So you have everything from, you know, the term is Luddites, so people who think that all technology is bad, it's going to ruin everything, it's bad for the worker, it's bad for society. And then you have these kind of techo-utopians who think that, you know, artificial intelligence and advances in technology are going to solve everything. We're just going to realize finally this theory of a leisure class, we're going to sit around and twiddle our thumbs and smile and talk to one another and-

Do podcasts.

Do podcasts all the time.

All day long. All day long.

Podcast was the example I used in class today, of what type of artistic expression we might end up with if there's no other work to do.

And I think that it'll take the robots at least a generation to be able to do their own podcasts.

Yeah, it might take them some time.

So the humans will continue.

Well, listen ... Well, who will listen? Will robots listen? Or we will be interested-

Oh, man.

In what they have to say?

That's interesting.

And there's actually already an artificial intelligent robot host of some news programming, where they've just replaced the-

The news reader.

The news ... Yeah. I saw this on a documentary that was covering robots in, I believe, Japan.

Oh.

So they're coming quickly. So you know, how do you ... Before we get into some of the details maybe of how these different mechanisms might work and why we should be worried about mass job loss or some evidence for why we shouldn't, how do you, where do you find yourself on this scale? I've kind of moved everywhere from being scared of these things and thinking, you know, the apocalypse is coming and there's not going to be any jobs left for humans to, all the other way on the other extreme, which is this leisure class idea, which is we're all just going to hang out and talk and engage in artistic expression.

And you know, how do you find ... How do you view, after doing your research and the people you've talked to for the work you did in the documentary, where have you found yourself kind of on this broad continuum of Luddite, of hating all the technology, to a technologist, you know, utopian?

Yeah, well, I mean, I just sound just totally like an academic by saying I'm somewhere in the middle, on the one hand-

That's what I say too.

On the one hand, and then on the other hand, right? As we love to say. Well, you know, I was like yourself. I mean, I think initially very concerned, you know? You hear about words like singularity, which is the idea that at some point artificial intelligence will become so advanced that that's the moment that we'll lose control of it and the world will slip away and, you know, we'll be finding ourselves talking to robots. And you know, I mean, I think that that, there is a dystopian vision that, you know, as a good researcher, I needed to take seriously. So that was why it was so interesting.

In this documentary, we talk with 20 Americans who know a lot about the subject, from Andrew Ng, who's one of the chief AI people in the world, had been head of AI at Stanford, head of Baidu in China. People like Daniela Rus, who's head of AI and robotics at MIT. You know, people who really know this stuff. People who are entrepreneurs in tech. Mark Cuban and Jerry Kaplan and other, a lot of tech entrepreneurs. And so it's very interesting to ask these people, "Okay, how worried are you? Let's really ... Let's be honest here. How bad is it?"

And it's just very interesting when you hear people in different parts of the country, for very different reasons, saying similar things. I mean, that's what researchers always do, right? We're looking for patterns in evidence and we're looking, we're trying to see what's the bias of a person giving evidence or not giving evidence. And we talked to Thomas Friedman. We talked to Garry Kasparov, who lost his job as the World Chess Champion when he was defeated by Deep Blue computer. And somebody like that really is like, oh, that's like ... It was funny. He was, said, "It wasn't just that I lost to a computer. It was the first time I'd lost, period."

That's a really-

I know.

Interesting point.

Then he lost to Putin.

Well, yeah. Now he's losing to Putin. Yeah, he's kind of upset about that.

Yeah, so I'm just saying, for some people, I mean, they have reasons to really be worried and yet they actually are less worried than I thought they were going to be. So ... And then the other part is, I always call this my 'hell in a handbasket theory of history,' all right? It applies to many topics. Which is that humans always say, "Oh my God. We're going to hell in a handbasket. This next generation, they are going to hell in a handbasket." And I'm like, "You know, they've said that every 20 years for the past 300?" If that were true, we'd be in hell, in a handbasket, right now.

So I think I'm, as a historian especially, that really grounds me.

Yeah, thing historical argument's the one that kind of ground me a little bit as I think about this because, as you ... So there's some interesting work on like task automation and then you mentioned singularity and there's a lot on technological evolution that talks about how a lot of technological progress is exponential and it continues to be exponential in terms of capacity and price for capacity as well.

And so when I was like first exposed to these things, I was like, "Oh, crap." Like you can see the little exponential graph going up and just like off into crazy-land, right? And then you like look at, to your point, looking at the Industrial Revolution and the past 300 years, there's been a number of technological advancements that have automated whole industries, not overnight, but in a very, very short amount of time. And here we are, 2019, we've gone through, depending on who you ask, three or four waves of major technological advancement and automation. And look, some people have a hard time finding jobs and that's not good, but unemployment's relatively low in the U.S., despite all these technological advances.

So what seems to happen is this kind of creative destruction element that we talk about with capitalism, right? That as one industry destroyed, it opens, more resources are still developed through the technological advancement, there's more accumulation of resources, and then that leads to new industries that we couldn't have expected before or grow in other industries that haven't been automated. And so this trend of lots of technological advancement, lots of progress, and yet, here we all are, all these hypotheses that we're going to sit around and be the leisure class. Just, none of that came true. And also, this idea that the Luddites had, that now all jobs are going to go away. Neither of these things have been true.

So the historical precedent kind of leaves us with, "Maybe it won't be so bad."

Yeah. And you know, just today I was working on something and I, for a variety of reasons, I pulled out Thomas Jefferson and Alexander Hamilton, who had this very conversation. It wasn't in a podcast. It was in a series of very vitriolic pamphlets, as it was-

They didn't like each other.

No, they didn't. Yeah, they-

They had different views about government, huh?

Yeah. One got himself killed over it.

I knew that before, though. Before the play.

Before the musical?

Yeah. Before the musical.

Oh my gosh. Oh, you were ahead of the ... Man ahead of his time [crosstalk 00:16:20].

Ahead of his time.

You know, you might say Jefferson was a Luddite.

Yeah.

You know? Hamilton was a high-tech guy. Jefferson argued, "Listen," you know, "thank God we don't have manufacturers. Let the Europeans dirty their hands with that." He really says this all in his notes on the state of Virginia, where he basically says, you know, "What we really want to be is we have a lot of land, let's all be farmers. That's the more virtuous, non-corrupt thing to do. Every man is independent." By the way, he said nothing about the slaves who were working on his farm. But nevertheless-

Yeah. He wasn't dirtying his hands on the farm.

No, not ever, really, ever. Except maybe with pencil dust and that, yeah, can be troublesome. But yeah, so he had this sort of Luddite idea that machinery and ... And in fact, he said, "Let it never be the case that we see any of our citizens sitting at a work bench." Yeah. By the way, he did have a nail manufacturing thing on his plantation and some people were sitting at the workbench, just to let you know. But anyway. That-

But there probably weren't other white men.

No, they were not.

Got it.

So-

What a hypocrite. I'm just ... I just dislike Jefferson to the core.

Well, you know, it's so funny-

Oh, yeah? He wrote, he had some beautiful prose.

He did. And the good thing-

Yeah, but all run through committee. And what did he do while the committee was improving the Declaration of Independence? Sat in the corner and sulked like a baby.

Strong Jefferson opinions, I like it.

I know. It's hard on Jefferson, you know? I think every party needs a hero, and so for the Democrats, one reason why we all adore Jefferson is because he became the hero of the Democratic Party, he became the foremost President of that party. And anyway. Well, that's a long ... That's another podcast.

Yeah.

All right.

But whereas Hamilton was saying something very different. It was interesting to read this today, because he was talking about, "Hey, look at those British. We could have what they have. They have mills that spin cotton thread and that's created a lot of wealth and it's created employment for women and children who get to work in the factories."

Now, by the way, that sounds really bad to our modern ears until you remember that he was raised by a single mother and had to go to work as a child. So maybe from his point of view that wasn't such a bad deal. But it was interesting, you know? So he was saying, you know, "We need to plan. We need to encourage manufacturing." So that debate about whether we're all going to, you know, end up in the leisure class or whether we'll all going to end up as slaves of the robots, is something that people have, you know, they've been talking about since the start of the Industrial Revolution.

I mean, you see it in the first science fiction, Mary Shelley, Frankenstein, I mean, that's AI.

Mm-hmm (affirmative).

So what is AI? How would you define it? How would you define artificial intelligence?

Well, okay, I can go. I think Justin might be ready, has ammunition drier than mine, but ... Well, artificial intelligence is essentially, it ... We call it the next, or in a way, the fourth Industrial Revolution. You know, the first Industrial Revolution was driven by steam. And yes, you get the whole history in 56 minutes if you come to see the movie, either on PBS or at the Bush School.

Check your local listings.

Check your ... Better yet, come on April 15th. It'll be a party. That'll be more fun.

But anyway, the first Industrial Revolution is steam, the second is electricity, the third is the digital/computer revolution, and the fourth is really AI. So we're just at the start of this, in a way, fourth Industrial Revolution, which is following pretty hard on the heels of just the third. So it's essentially we're ... Computers, in the past, you would have to give a computer a very specific set of instructions for everything and if you missed a tick, it would go, "Error," you know, crash, boom, nowhere, no-go, you know, "Go back home. Nope, don't pass Go," et cetera. So, straight to jail.

So one of the things that artificial intelligence does and where it separates from traditional computers is the ability to give a soft, create software, which is what it is, it's software, where the software is given a goal by the programmer, you know, "This is the effect you need to achieve. Land an airplane." And before that, you say, "Here's all the data on how airplanes are landed." You know, millions and millions of examples of airplanes landing. "Now you figure out, Mr. Computer, Mrs. Computer, Ms. Computer," you know, "how you get from this data I've just given you," data, we call it big data because it's bigger than any human brain could ever have.

As they say, you can't write fast enough, small enough, long enough, to get all that data into one human brain, but the computer can because servers have gotten so big and memory has gotten so large, that now computers can, in a way, write their own instructions. But it's always for what scientists call 'specific intelligences.' It's not what we're always worried, which is general intelligence. That's what we humans have, that's what a baby of two has, is general intelligence. And a computer is pretty doggone dumb.

Yeah, I would just echo some of that. So there's no one tool that's artificial intelligence. And, as Lisa mentions, those in the artificial intelligence community usually distinguish across two different types, which is the weak or narrow AI. And this is training an artificial intelligence to be good at some specific task, like identifying cats on the internet or something. And then there's-

That's useful.

It's very useful.

That's fun. That's really fun, actually.

Yeah, we spend a lot of time doing that.

I'm glad they set that goal.

And then the other is what's called either strong, by some folks, or general intelligence. And this is the idea to learn across different types of context and different types of domains rather than just one, like learning how to play chess. So the AI that beat Garry Kasparov was a narrow AI. It got really good at maximizing one goal in a clearly, like defined decision space, which is chess. [crosstalk 00:22:19]-

With very finite and circumscribed rules.

Exactly. And these systems, without going into too much detail, learn in different ways. But in general, it's statistics-based reasoning. There's some sort of expert coding which is sometimes what variables might be important. This is kind of at the high level, structural level. And then there's kind of churning through all the correlations, churning through all the data, to find patterns, just in similar ways that humans would. You know, you would learn how to play a sport, for example, or learn how to play chess. You have repeated examples of some decision space, some task space, and overall, over time you learn to be good at it.

And in some real, meaningful ways-

So does the computer know the failures and the successes? Or is that part of the programmer's job? To say, "When the plane crashes, that's a failure. Don't do that." Or does the ... Is that the artificial part of the intelligence? That eventually the computer program doesn't have to be told what the right result is, but finds out what the right result is.

So there's two main steams that people talk about. There's what's called supervised learning models and unsupervised learning models. In these supervised learning models, the computer programmers are a little, are much more explicit, "This is what you're looking for, these are the variables, roughly. Now go and figure out how strong all these variables are."

Like how to win a chess game?

Yes. Then there's ... Loosely. Then there's these unsupervised models where it's, "Hey, we're going to show you like a million pictures and we're not going to identify the cat in them." We're going to tell you, "Hey, in half of these, there's a cat. The other half, there's not a cat. You go figure out which parts are important."

The other thing that the systems do is be given a goal without anything, other information about it. So you might say, like some of the other classic examples are playing like Atari games. Greg, you might remember Atari. It's a little before my time, I mean-

I am old. Yeah. I am old.

It's a good running joke. But you might think of an Atari or like an original Nintendo where your score, every time you jumped on a turtle or got a point increased. And so one of the things that they are able to do across some games now is tell the computer, "Hey, your goal is to get more points. We're not telling you anything else about that goal, but you get all those coins and points as possible." And then the software, the learning algorithm, learns all the parameters that helps them maximize that goal.

Having inputted hundreds and thousands and millions of Atari games.

Yeah. And sometimes it learns from what other ... Like with the chess games, right? So sometimes it learns by looking at other games that chess players have played, like humans. And then what some of the advances now that they can do is have it play against itself. And so it'll play and get its, the best mode, and then it'll start changing some random variations to play against itself. And then it iterates and improves against itself.

And one of the interesting things that Garry Kasparov pointed out is that, you know, if it's just human versus the machine, the machine will win every time, at chess. But if it's a human and a machine, they can always beat the machine. And it's because of the additional things that the human ... So now, a lot of chess is played with, you know, two humans and two machines versus each other because, I mean, this is the nature of, way, you know, what we would call labor-saving devices. I mean, that's what industrialization has always been about, which is how to take the stuff I don't really want to do and it's just a hassle and let me get rid of that part so that what makes me human is the thing I get to focus on.

And so that's, I think, one of the things I took away from making the film was what it really challenges us to do is to figure out what is that thing, you know? What is that interesting essence that we humans bring to things? You know, it's the old idea of it's, you know, we don't feel threatened because cars go faster than we do. I cannot run as fast as a car. Am I threatened by the car? No, I'm so excited that it goes faster than I do. So with artificial intelligence, a lot of it is, yes, you know, it can figure out these things and that's a great explanation, Justin, for the, you know, how it sets up. But then you might think, "Well, then there's nothing left for us to do," and that actually turns out not to be true.

Yeah. Which is ... So, and I want to get to another piece of this, but I think this is a really crucial part is that there remain lots of things about certain tasks, this is how I think about them in my research, that humans just, there's some things humans just do much better than machines and there are some things humans do much poorly. So part of the decision-making class that I'm teaching this semester is trying to find all, it's in part looking at all the ways in, all the situations in which we know humans perform poorly.

For example, under conditions of uncertainty, which is what behavioral economics and Daniel Kahneman have given us. And then looking at the types of situations where AI might thrive, and these are in general tasks that are more routine, that have less uncertainty associated with them, they have clearly defined spaces. They do much poorly in open-ended areas, much more poorly in like generating new hypotheses about things. They're not so good from this creativity measure, actually, very, very poor.

And so this does kind of raise a question of, "If tasks are going to be automated," and this is the question that I ask in my research for governance, "well, which tasks should we automate? Which tasks should we let the artificial intelligence play and do things and try to improve government?" And then, "Which tasks tasks should we say, 'No, no, no, no. These really belong in human affairs because it has to do with overall creativity, it has to do with human care, it has to do with helping professions where people really benefit from that kind of human connection.'"

So, Lisa, without spoiling the documentary, what areas of work do the people who you talked to see as kind of being the first ones that we're maybe already seeing artificial intelligence change what humans do or the kinds of jobs that humans have?

Well, Mark Cuban said, you know, "If you're on a phone, your job's gone."

Yeah.

So that's tough.

Yeah.

Yeah.

A lot of people on the phone. And of course we know cars, automobile automation, driverless cars, which are going to save a lot of lives, you know? Because we're all idiots.

Right.

I'm thinking about 12 things when I make a left turn and they're not all the left turn. So-

And that's even among the sober people who get [crosstalk 00:29:24]-

And that's behind the sort of people who-

Right?

Yeah, exactly. So this, I mean, this goes back to what Justin was just saying. If a machine does something better, probably we ought to let the machine do it. Another expert in the show, Andrew McAfee, who's written wonderful books on this subject, he's at MIT also, and he said, "When it comes to thinks like medical decisions, like there are decades' worth of algorithms that show that," you know, "that the algorithm will make a better decision than you will or than the doctor will."

And so for heaven's sake, take the algorithm because, you know, God, I want to live. I want my children to live. I don't want somebody to have a bad day and make a bad decision or, you know, guess wrong. You know, if you can guess ... If you can make a decision based on 10 million examples rather than the 10 years' experience that a doctor has had with 500 cases, well, you know, I want to talk to the doctor. You know, I want to have that human being there for me. But if a robot can do the surgery better and more likely ensure my survival or the survival of my child, well, there's no question which I'm going to take.

Yeah, this is an interesting example of trying to think about what the role is, even when a machine is better, what role a human still plays. So in the news a couple of weeks ago, there was this article where a, it was talking about how a doctor, via Skype, on a little tablet on a little, you know, robot, rolled up to a patient and said, "Hey, by the way, you're going to die," right? And so, you know, use of regular technologies and artificial intelligence technology, but this is a modern technology. It's pretty easy to Skype in from halfway across the world if you're a doctor and surprise, surprise, the family didn't like that.

Yeah.

Right? And so this-

One wonders why.

This asks questions. So to your question too, there's actually a decent amount of research on what types of professions, based on what types of tasks make up those professions, of which ones that are likely to be automated.

So, Lisa mentioned a couple of these. Others include food service and food prep is one. Another is like fraud detection, and another is construction work, and you think about advances in 3D printing. Another is ... Let's see if I can remember any-

Construction work?

Yeah, construction work. Yep. As different kind of tasks just are done by robots rather than by construction workers.

Of course that would depend on what kind of house you want, wouldn't it?

And what of construction.

Yeah.

You know, so if you're looking at mass housing, all identical houses ... I mean, they say that the main thing is that anything that's routine and repetitive, that's what can be automated, most routine, repetitive tasks.

So-

It's anything that involves like, "I didn't expect that to happen."

Right.

That's where humans come back into the picture.

So there are many fewer humans working on the assembly line to make a car now. We know that, right?

Exactly, yeah.

And you know, by the way, that precedent goes back to Cyrus McCormick and the mechanical reaper, you know?

That's why the Luddites destroyed the machines-

Yeah, right, because, you know-

Because they thought, because they were losing jobs.

Right. But someone once said, they were saying that ... This was in China and, you know, they showed people with wheelbarrows and they were being replaced by steam-driven tractors. And like, "Well, isn't that going to get rid of people's jobs?" Yeah, well, actually, if your goal was to provide jobs, just give everybody a teaspoon, you know? And that's, you can move earth that way too. But is that really what we want to do?

So what are the historical ... We're in the fourth of these technological revolutions that recreate work. What were the social and political consequences of the other three that we can learn from? Did they disrupt the politics? Like I would assume, right? That politics was quite disrupted. Social life was disrupted by the move from the countryside to the city. I mean, that's the Industrial Revolution, right?

Yeah. Extraordinarily so.

So are we going to see those kinds of disruptions?

Yeah, I think we have. I think we are. I mean, I think our politics today are roiled partly by, you know, those anxieties and that feeling of maybe some people are going to end up with all the chips and other people are going to starve. And you know, those are legitimate worries.

Did we have the same debates about inequality over the previous ones?

In a way. I go back to Jefferson and Hamilton, you know, where the idea of the folks on the Jeffersonian side of that debate was that we would have European-style inequality in the United States.

Sounds like European-style socialism, which is-

Yeah.

I know. It's so funny. We're always defining ourselves against what the Europeans are doing. Although, of course, again, the great irony of saying that is that we had American-style slavery, so you know?

Right. Right.

So it was ... You know, we're just ... You know, there you go. You know, my family ... I always remember growing up and my mother would say, "Your dad's people are Okies," you know? That wasn't a good word-

No.

Just FYI, the way my mother said it in her mouth. I don't know, it just never sounded good.

I don't think, for Texans, it's still a good word.

it's still not good, possibly, yeah.

It's not a good word, yeah.

But if you're from Oklahoma, [inaudible 00:34:46] it's a perfectly nice word.

Yeah.

So I mean, that whole period, when we look at the 1930s, I mean, that was a consequence of many things, including the mechanization of farming. Not only was environmental disaster and there were several things that were going all together there, you know, the effects of World War I, but one of the big effects was that was part of a long-term trend of people being pushed off the land because there were more efficient ways to farm. And it was very painful and very hard and, you know, listen to Woodie Guthrie, you know?

So that's happened before. And Greg mentioned the Luddites, that was early 19th century. All the novels of Charles Dickens are all about, you know, from "The Christmas Carol" to "Bleak House" to "David Copperfield", are all about what happens in these, you know, periods of real industrialization. And I guess, I think that's why, I mean, to me, it's always interesting to take that long history perspective because you, you know, you say, "Okay, well, yeah, that was really grim." But what were the long-term consequences? Some of the short-term consequences were terrible. Industrialization deepened American slavery. The cotton gin, which was a part of the, you know, that whole trend towards mechanization of textile production, created deeper commitment in the American South to the institution of slavery.

Right before the cotton gin, there was this belief that slavery was going to wither away because it wasn't economical and then the cotton gin made, you know, gave cotton production this enormous boost in terms of productivity. I mean, we're in historic downtown Bryan. This was a cotton town. This was a place where cotton farmers brought their cotton to market so they could put it on a train.

Right. And there were actually ... And there were ... And Britain, British industrialists funded the railroad that runs through downtown Bryan. I think we heard it earlier on the podcast. You know, we had the, "Woo-woo," of the train.

Yeah, yeah. Yeah.

I mean, that train goes back to the British demand for American cotton grown by American slaves, people who had been enslaved by American planters. And so that's why industrialization, it's always, there are always bitter things about it. You know, there's unintended consequences. In fact, the law of unintended consequences is, "There are always unintended consequences." If they were intended, you wouldn't do it.

So you know, I think that we saw that before and what we've also seen is that how we respond to it is everything. I mean, there is actually a recipe for success and a recipe for survival of each wave of industrialization.

But there's also a lot of fear, right? And you can see it in our politics today, right? And appeals to fear are extremely mobilizing in the political sphere.

Yeah, and it's so sad, Greg, too. I had a wonderful talk recently at Hoover Institution, where I hang out part of the time at Stanford, by Admiral James Ellis. And he was saying, "Good leaders absorb fear."

Instead of stoke it?

Right. Now, you think of a man, a leader in combat ... George Washington's job was to absorb fear, to give Americans confidence that this was all going to come sunny-side up. "It might look bad right now, but it's all going to come sunny-side up."

So you know, I do think that is a function of really good leaders. But unfortunately we don't always get it.

So one of the things that ... I'm going to avoid the bait of talking about leaders that stoke fear because it's too easy.

Too easy.

One of the things that ... I've seen folks make arguments about how AI is different, and one proponent of this is another historian you've all ... Noah Hariri. Talks about how in previous technological revolutions, part of what was going on was oppressing the worker and trying to keep them from getting too much power, keeping them from having unions, keeping them away from collective bargaining. And that that was a type of problem.

But the thing that he worries about is this idea that people have become useless and that they don't feel like they have a purpose because if these new jobs don't show up after their jobs are automated ... In particular, if you think about older workers that aren't used to having to retrain, that this is going to cause some real problems as people feel useless. And some kind of tentative evidence for this, right? Is the rising suicide rate, particularly among 50 plus white men, for example, people that used to have a stronger place in the job, in the labor market and maybe feel like they're not as important. Maybe they feel they're useless, to use the term, and so then what they resort to is suicide.

And his point is that people that feel useless respond to threats differently than those that feel oppressed. Oppressed people fight back often, they push back, they try to get their rights. People that feel like they play no role and are completely useless turn a little bit more inward and then you have more political instability in that way, not to mention maybe, potentially rising rates of suicide. So this fear, whether it's warranted or not, I think is an open question when it comes to technology. I don't want to go all the way into the Luddite camp, but there is, you know, when you see the advances in artificial intelligence, specifically in the pace of which, and the way, the pace at which it's spreading and spreading as an academic, spreading in the private market, starting to spread in governance, it seems to be happening at a really quick pace.

And so one thing that economists point out is, and Daron Acemoglu has a new paper that works on this that came out last year, that there's a lag, right? And that part of the story is if automation is really, really, really fast, if these new technologies happen really, really quickly, labor needs time to adjust. People need time to retrain, people need time to get in new industries. And so there is this concern that as technological evolution is continuing to increase exponentially, if the power, processing power of AI, it's ability to learn, also continues to grow exponentially, that it will look a little different this time. Certainly not something ruled out.

And if that's the case, then you do have very fast automation, which then makes it hard for labor to catch up and have, develop new industries. And so I do think there is a little bit of a concern here, given the pace of AI development, that despite with it ... For example, with the Industrial Revolution, you needed more hardware than you need to deploy AI. AI is software. You still need some hardware, but the hardware you need to deploy AI is much cheaper, relatively. And so there's this question of, "Would this technological revolution, will it have some of the same kind of bumps along the road to slow down the pace of automation that we had in the past?" And it's not at all clear, you know, to be a little bit more concerned about this, it's not all clear to me that this pace of automation will be sustainable.

So what's the role of government in all of this?

Well, talking to people at the Bush School of Government, you know, this is a very important question. I think the role of government is critical. And you know, I told you I was reading Hamilton's report on manufacturers. And what he was saying is that people are so traditional that even when things get really rough, they'll just slog along at poor wages. Even as jobs disappear, they'll just kind of eking it out.

Oh, by the way, I feel like I'm reading about modern America when I hear that, you know? Just the barista, all the baristas will just continue to take their meager wages and not have, you know ... And we have a problem in American partly with lack of mobility. People don't move around. They don't go where the jobs are. And so we're just kind of slogging through-

We're less mobile than we used to be.

We're much less mobile. There's much less-

Geographically and by class and income.

Yeah. But especially in this case, the geographical, because there can be jobs places and people are like, "Oh, I think I'll just stay here." So Alexander Hamilton knew about this problem and he said, "This is the role of government, to give people confidence, to make these, entice people to do new things," you know, "to set up various kinds of incentives for people to move around."

So I think it's always been really important. And you know, whether you call it that, the social safety net, or something else ... And of course, I mean, this does bring the question, we won't go there because you just told us we're not going to, but, which is, you know, as a country, we need to work together. We have to pull together. It's just really not about technology. This is about humans not doing what humans can do very well, which is to cooperate with each other, you know? We have that potential. If we fail to do that, it's not because of the robots.

I will just point out that this is the second podcast in a row in which Hamilton's first report to the Congress on manufacturers was referenced.

Oh.

Didn't see that coming.

I referenced it in our last podcast with Raymond Robertson when we were talking about-

Oh, yeah, that's right.

Trade and people were asking about, "Well, what's the argument for protectionism?" And I said, "Well, historically, there was an argument for protectionism. It was made by Alexander Hamilton."

Alexander Hamilton.

So very good. We've got two in a row in which Hamilton's report on manufacturers was referenced.

Which normally puts people right to sleep. They just cannot bear that.

No, it's so exciting. So exciting.

No, here's the songs, dancing around-

To people like us, it's a theory. It's like-

Yeah, yeah, yeah. That's right.

You know, sorry, I wrote this novel on Hamilton. My little story about that is I went to my agent and my publisher several years ago and I said, "You know, I want to write a novel about the sexiest man in the American Revolution, Alexander Hamilton."

Got to be Alexander Hamilton.

And they said, "We will never be able to sell a book on Alexander Hamilton. He is so boring. Just go find yourself another topic."

He's boring?

Oh, yeah.

Was this before or after the Chernow volume?

No. Before-

It was before the Chernow volume?

Yeah, pretty much. Yeah. You know, around then.

Around then, yeah.

I wasn't paying really attention.

Because I mean, the Chernow volume was a huge best seller.

Yeah.

I mean, that's where Lin Manuel Miranda got his idea for the-

Absolutely. Absolutely.

For the musical.

But unfortunately, they weren't buying it from me. Until somebody starting singing about it.

Yeah. There you go.

And you may remember than even Obama laughed at Lin Manuel Miranda when he first appeared at the White House and Miranda said, "I'm going to talk about the man who I think embodies hip-hop, Alexander Hamilton."

Alexander Hamilton.

And the Obamas burst out.

That's hilarious. Just one comment on what role should government play. Yep, yep. Greg's reminding me that it is at the 44 minute moment, mark. But just ... I wanted to say, is I think there's two important pieces. One is how we can use these tools of AI to improve governance and we need to be careful about how we do that because it's different than when private actors are doing it.

Right.

So we need to worry about accountability, we need to-

Privacy concerns.

Worry about transparency, privacy, discrimination, all of these things, when you start introducing these tools into governance matter. However, there are lots and lots of opportunities that might cut down on either government errors or overall government performance if it's done intelligently and carefully.

The second piece is thinking about the consequences of if automation is challenging and there is a, it causes unemployment to go up, what should we do? And this is, you know, different philosophies about what the role of government should be. Thinkers that I've read have two suggestions on this which I'll just share and then we'll move to questions. One is, which we've heard, is some type of income insurance, whether that's expanding unemployment insurance, whether that's some universal basic income, some type of insurance for people who lose their jobs as a result of machines.

The second, that is proposed by Kai-Fu Lee in his recent book that compares the strategic approach to AI from U.S. and China, is this idea of subsidizing caring professions. And so the idea is that the tasks that computers and AI do poorly are like nurses taking care of the young, taking care of the elderly, basic helping professions. And so one way to mitigate the automation from AI is instead of subsidizing some of the things we're subsidizing now, maybe, whichever you pick, whether it's whatever, farming, oil, different types of energy, whatever-

Construction.

Construction, right. But instead, we should subsidize these caring professions. That these are going to be something that people will always need to do for the foreseeable future because that human touch matters and so we need to make those types of jobs have real quality wages and quality of life so that more people will want to do them.

Well, of course, women who've worked in the home for many generations would think that this is a good argument to be made. And actually, that's one of the challenges here, by the way, is that so many of those occupations have been traditionally female occupations.

Right.

And I think ... You know, you were talking about white men or middle class men and suicide rates and all that. I mean, part of the problem is that there is a gender imbalance in terms of which occupations may be automated, especially if you talk about things like truck driving and construction and oil rigs and mining and things that men-

They have some common themes, yeah.

Right. There's some common themes there. Whereas nursing and elder care and child-

Teachers.

Teachers and-

Childcare.

These are the things which are really, you know, do we care enough about those things? Do we really care enough?

I hope so. Thank you. All right. So the time has come, even though we went a little bit long because this is what I do research on, so I got a little carried with our guest today.

I thought it was a podcast about, you know, what Lisa Cobbs was doing, not a podcast about what Justin Bullock was doing.

No, it was about, a podcast about Justin Bullock is doing, yeah.

Yeah.

I've been waiting to talk about it.

Thank goodness.

So, with that, we have a nice crowd with us today. Does anyone have a question they would like to ask of the panel? I promise to let the guest speak.

Hi.

How are you doing?

Thanks for coming. I know we've talked about policy a little bit, but do you think the first to kind of pass policies as far as artificial intelligence will be the federal government, or do you think it will take kind of a state approach where you have some states, maybe like California, that has Silicon Valley, be pro-AI versus other agrarian states being anti-AI?

So the question was as concerns about AI move forward, it becomes more, a bigger player, do we think that policy will take action more at the federal level or at the state or local level? Who will be leading the charge?

Yeah, that's a hard question to answer. Of course, so many of these things, especially because AI is all-embracing, right? You can't say, "Well, my iPhone stops here," right? No, these things go across state barriers and international barriers that ... I think it's going to be hard, especially with things like privacy regulations and stuff like that. Although there are differences between how the EU handles things like this and how the United States handles things like this. So you know, I think certainly most of the policies that we see are at the, really at the highest levels. But on the other hand, you know, these can even just be private efforts. You know, how do we take care of people who are displaced? I mean, that's something that churches can get involved in, you know? And individuals, and it doesn't always have to be a top-down government approach. Although certainly when it comes to taxing and income support and stuff like that, you know, I think it's going to be a federal effort if it's going to happen.

No, but I thought the interesting thing was that you added the international level. I mean, this might be an issue of international regulation, you know, through treaties and international organizations, which of course is the federal government in the United States' case. But you know, at a level above the federal level is perhaps where some of this regulation is going to occur.

Well, and another area that the film actually delves into a lot which we haven't talked about is the consequences for education. Because how do we get ready, I mean, how are we getting our kids ready? You know, Thomas Friedman, who's in the film, he says, "I think we're doing a really good job of educating people for jobs we needed 70 years ago."

So that's, by the way, a state question and a local question, schools. So those are, you know, that's a way in which lower levels of government, so to speak, have a big responsibility.

So the, just to add to it, all levels are already playing a role in some way or another. So you have international groups of scientists that are working to make sure that AI is a beneficial AI. You have the federal government. The Obama administration did a big report on AI and how it was affecting the economy and government. President Trump in mid-February issued an executive order trying to increase and maintain the U.S.' like dominance, although it's, you know, waning a little bit, but the U.S.' dominance in AI. And then a lot of the initiatives, when you hear things about, say, smart cities, for example ... Smart cities use a variety of tools, but some of the tools that they do use and actually delivering services on the ground and improving them are versions of narrow AI.

So you're already seeing different groups kind of adapt it to their context, right? Local governments out providing services with it. Federal governments kind of providing resources and structure and something of a plan. You have international organizations, like The World Economic Forum, who are really talking about these. And then you have groups of kind of leading scientists that are really trying to frame the decision, they're trying to grab, they're trying to get policymakers to be a part of this. And they're really, not all of them, but there's becoming a large community of folks within the AI community that are like, "Okay, it can't just be engineers and computer scientists going along at the next problem. We have to think about what the societal impacts are."

So lots of players are already really wrestling with this.

All right, so a lot of what you're talking about it is more broad than cyber or AI. It's about technology in general. And one of the fears that people have is that it isn't going to be government that drives this per se, it's going to be the private sector and the profit motive, right? Nobody ... I mean, Justin kind of alluded to this a little while ago. One of the concerns that people have is that we'll do the things that people can make money at, not the things that are good for people, for society, and that government will just be captured by the people who have the money.

So how do we deal with these issues? I direct the Institute for Science, Technology, and Public Policy at the Bush School. We deal with these issues on everything we touch, right? We don't have any answers. I'm asking you to provide me with some answers. Is that unfair?

Well, yeah. Well, one of the experts who's in the film, who has lots of wonderful and interesting things to say as a economist/historian/literature critic, named Deirdre McCloskey, who talks about Adam Smith, you know? And the often misunderstanding of Adam Smith, who advocated the idea that, you know, we need to let the market work, that the market ... Actually, that profit-making is a good thing. That's actually how we incentivize people to do important new stuff.

Sure. Absolutely.

But, as she points out, that, if you just take that as the only interpretation of Adam Smith, you're missing a lot. Because he also talks about the role of government in watching out for the common wealth, that that's why we have government, that's why we don't just have the private sector, that both have a really important role to play.

So will government be captured? That's the, you know, that's the ... That's always the big question, the 60 million dollar ... What is the figure nowadays? It keeps going up.

[crosstalk 00:54:04]

Well, I'm old, so I just-

[crosstalk 00:54:06]

It's a billion dollars.

You know, I just go back to the $64,000 question and let people Google it, you know?

Right. Thank you, Greg. But it's the big question. And that's something ... And that's the ... You know, that's the cool thing about history, is that you go, "Whoa, people were like dealing with this in Roman times," and then, "They were dealing with it during the American Civil War." And you know, that's what keeps life exciting and also that's what makes us human.

One of the things that I've seen, and it doesn't actually stop the capture problem, but as I was mentioning a minute ago, within the AI, at least the AI-specific community, they're starting to think more carefully about how they, about transparency, right? There's this norm in the artificial intelligence and in science in general to be completely transparent and open with the things that you learn. So they're kind of reflecting on, "Is it good that we just make this available to anyone, including, potentially, corporations?"

The other piece that I think could be helpful is the piece that I, the argument that I've read that had some legs, to me, on this, is thinking about how we navigate a nuclear, the ability to split the atom and nuclear bombs. And in this realm, scientists themselves played a large role in going to the general public and pleading for intelligent use of these tools. And so I think scientists and academics like us can play, you know, maybe not much of a role compared to money, but at least some role in thinking about what the professional norms are around developing these tools.

You know, a lot of ... Some artificial intelligence scholars that work with DARPA, for example, or that have worked with Google, have left in protest of the different types of projects that Google had with the U.S. government. And so there are some ways to at least send signals up that the general public doesn't approve of these and that the experts doing the research have a general direction they want this to go. But it seems pretty clear to me that, at least in terms of relative power, that these technological corporations are certainly rivaling state governments in the number, in the amount of resources and power they have already. And I think it's already a question of how much of the federal government have they already captured just through lobbying efforts and the amount of resources.

So hopefully, you know, Larry Page and Mark Zuckerburg are friendly people at their core, and Jeff Bezos.

Yes, so I have wanted to ask a question about the science and technology policy, that perspective. So, so far industrial revolution has been working as a [inaudible 00:56:54], even though we actually worried about losing jobs for the first time. But we, you have many more chances using those technologies. So basically I think that industrial revolution has been working as more constructive and positive ways [inaudible 00:57:12] perspective. But artificial intelligence ... I'm thinking that basically, so far, science and technology and industrial revolution has to be just tools of the human. But in my understanding, artificial intelligence is intelligence and it's basically, not just programming, but it's about learning. So it can't learn it by itself. It means that it has a function of brain, in terms of human, not just body as a tool.

So I think that artificial intelligence could be somewhat differentiated from conventional technologies. So I have been wondering if we can induce the future of, the future roles of AI, differentiating from previous industrial revolution, or at least ... I wanted, I really wanted to ask some historian about this perspective. Like if we can measure some serious differences or no differences in between each Industrial Revolution. So I'm basically wondering if we can induce the future of AI in the historical perspective.

So the general question, as I understood it, was, "Is AI different," or, "In what ways might it be different from previous technological revolutions? And if so, what does that say about its ability and how it might impact us?"

Yeah, and that's a really good question. I mean, you might be saying, "Is it additive or is it transformative," right? Is it just like, you know, a new form of ... Like we didn't use to have telephones and now we have telephones, isn't that cool? And certainly some people worry that that is and that's what we often, that's what's called singularity, the idea that it will then become, and as Justin was talking about, this [inaudible 00:59:00], sort of general intelligence and then it will take over and our lives will never be the same.

And that's certainly what we see portrayed in film all the time. In fact, one of the fun things about making this film is we got to use all these great, you know, "The Matrix" and you know-

Terminator.

"The Terminator." Yes, "The Terminator" and ... But also fun things like Mike Myers's "Austin Powers" and ... I mean, those, that meme that the robots are coming is in so many things. And in a way, I don't have the answer, you know? Come see the film. But it's also nobody has the answer.

Right.

Nobody can know the future. The best predictor of the future is the past. Past waves of technology we have managed to harness and Justin just mentioned nuclear power, which was very frightening and for very good reasons because it's a very frightening thing. One of the clips we have in the film is of the terrible occasion on which Thomas Edison electrocuted an elephant, a very healthy, happy, pretty elephant, live elephant. But to show electricity can be really bad.

So that fear ... But it can also be made safe enough that a child can turn on the light and be fine. So I hear what you're saying and I think it's a very important question. Scientists say ... Andrew Ng, who is probably the world expert on this subject, I asked him this very question. Very, very nice man, very sincere and I don't think he has any reason to try and snow me on it. He said, "We don't know that. Maybe that could happen. But right now it's like worrying about overpopulation on Mars, okay?"

And what that fear does is it takes our eyes off the things we know are problems. We have a lot of problems to solve, that if we could stop worrying for just a few minutes about "Westworld" robots, you know, we could take care of the things that we do know are going to be a big problem for our population if we don't get a handle on them. Things like education, things like a safety net, things like retraining of older workers. We have got to start talking about those things.

And I would just add that scholars take different views of this, which Lisa mentioned. And there's another whole group that, centered around existential risk, which Nick Bostrom, Eliezer Yudkowsky, are the two that immediately come to mind, that are really worried about what they call 'value alignment' and control of general AI. And they would make the argument that this is one of the hardest problems we can picture, something that has more intelligence than us, how we can make sure that it likes us and that we remain control in it, remain control over it. It is the question.

So there is this other end of the spectrum on some of these AI scholars and ones that worry about AI and policy. There's this one side of that says, "Let's focus on these issues in front of us. They're really important," as Lisa mentions. The other side would say, "Yeah, those are really important. But if we don't get this big picture question right, of making sure that the AI's goals are aligned with us, we lose. And so maybe we should be spending time thinking about that." But as you-

Well, Stephen Hawking said, you know, "This could spell the end of the human race." And Elon Musk is building, you know, space-exploring type things, equipment so that he can go to Mars. Now, I don't know what's going to happen to the rest of us-

The rest of us might be stuck here.

Down here on Earth, but you know, he's also sort of said that, you know, "Get ready."

Will there be any place like Downtown Uncorked on Mars?

No, there won't.

Certainly not historic Bryan.

Yeah.

But it seems like it's that time for us to go enjoy Downtown Uncorked.

I think so.

[crosstalk 01:02:56] Bryan.

So thank you so much for the audience. Thanks for your questions. Thanks for the listeners. And most importantly, thank you Professor Elizabeth Cobbs for joining us for this conversation.

And let's plump the premiere again. It's April 15th at the Presidential Conference Center on the Texas A&M campus, out on west campus by the Presidential Library, and it starts at ...

6 PM.

6 PM.

6 PM.

And it's a 56-minute film, followed by a fascinating conversation with people like Justin Bullock and Tracy Hammond and Johnathan Coopersmith. So it'll be a good time.

Yep. Hope to see you there. Thank you so much for listening.