

# Ep.3.52 - Leo Kempel

Fri, Feb 02, 2024 2:40PM 30:03

## SUMMARY KEYWORDS

michigan, engineering, state, part, students, people, college, university, innovation, engineers, economy, helps, learn, world, told, fraunhofer, msu, technology, country, degree

## SPEAKERS

Ed Clemente, Announcer, Leo Kempel

---

### A Announcer 00:01

Welcome to The Michigan Opportunity, an economic development discussion series featuring candid conversations with business leaders and innovators across Michigan, you'll hear firsthand accounts on how the state is driving job growth and business investment, supporting a thriving entrepreneurial ecosystem, building vibrant communities and helping to attract and retain one of the most diverse and talented workforces in the nation. And now, your host, Ed Clemente.

### E Ed Clemente 00:29

Well, welcome to the show. I'm your host, Ed Clemente. And we're very fortunate, I will give you your formal title first, Dean Leo Kempel. He's the dean of Michigan State University College of Engineering. Welcome to the show. And he gave me permission to call him Leo. But welcome to the show, Leo.

### L Leo Kempel 00:44

Thanks so much, Ed.

### E Ed Clemente 00:46

And it's really a pleasure to get you on here. And I know you're very much in demand, it took us a while to schedule you. Because I know you're pretty tightly scheduled with so many great things that are going on. And in this era, at least in my lifetime, there's never been such a big emphasis on a lot of the stuff that you guys are doing. So why don't you tell us your elevator speech of what the School of Engineering does at MSU?



**L** Leo Kempel 01:13

Yeah, so the College of Engineering at MSU has been around for well over a century. And one thing that we've had from day one to today and beyond, is going to be making sure we prepare engineers and computer scientists to meet the needs of industry here in the great state of Michigan. Our goal here is to make sure that we provide the best possible talent source to grow our economy, and to make sure that all Michiganders thrive going into the 21st century.

**E** Ed Clemente 01:48

Yeah, as someone who has a ton of friends and a State graduate as well, but, I have a lot of ties with U of M, too, how many engineers, including Wayne State, we've had the University Research Corridor on before, too, why is there so many engineers? I know there's always some factoids about that. Why are we so blessed with so many engineers?

**L** Leo Kempel 02:16

One reason is that Michigan has been and continues to be really the center of innovation in this nation. For well over a century. If you go in the Wayback Machine, to the turn of the 20th century, the biggest innovation that had the biggest impact on our society, our way of life, and our economy was the automobile, and the kind of changes made in Detroit, that caused the automobile to be a ubiquitous part of our lives. That hasn't changed. And so from the very beginning, engineering, innovation and technology have been part of the ethos in Michigan, I can say that the Engineering Society of Detroit, which I'm a proud member of, has been one of the longest lasting professional societies. And the only one that I'm aware of, that covers the entire state and all fields of engineering, from traditional civil engineering, which you think about it started back in the time of the Roman Empire, all the way through to computer science, data science, and all the emerging trends in bioscience, that are part of where our economy is going, going forward.

**E** Ed Clemente 03:36

And obviously, the huge push which will never stop for STEM at all levels now, and lifelong learning. Because, as I'm sure you know, with your field, that things are leapfrogging and changing, given with new discoveries a lot. So it's actually a great time, I think to be in the engineering field, at least in my opinion,

**L** Leo Kempel 03:58

It's a tremendous time. Our enrollment is going up here in in East Lansing. This past fall, we welcomed around 1800 new students who want to pursue a degree in our college. I'm predicting at least that number next fall. And so part of what our college is about is again, training people for the great state of Michigan. And that includes the fact that we have 7000 students in the college right now. And according to our data, almost 60% stay here in Michigan when they finish, and 75% stay in the Midwest part of the country. So we're a big source of talent for the economy around us and beyond the state here.

E

Ed Clemente 04:49

Yeah, and I would imagine that sort of feeds into, nothing against East Coast, West Coast stuff, but it helps with the Midwest I think in general that it becomes an innovation region and ecosystem that even though, Ohio, Indiana, or Illinois or whatever, but because so many engineers being here, you have that sort of ripple effect, especially with, as you said, Michigan sort of being the innovative hub somewhat, not just for the Midwest, but for the country in a lot of ways.

L

Leo Kempel 05:18

Right? If you really look at it, the quality of life here in the Midwest is unparalleled. Because you can come here, I can spend three hours in a car on the coasts, getting from one side of town to the other, I can spend three hours in a car built here in the great state of Michigan, of course, and get from from East Lansing, Michigan, to Traverse City. And so personally, I know where I would want to live and do live. Because it's that quality of life. It's not just the opportunities of our companies, and the opportunities that the state brings to bear for us. It's the opportunity of tremendous times for our families. The schools are excellent and the environment's excellent. You can buy a house for a reasonable amount of money, and still have enough leftover for vacation and such. And at the same time, I would say that the state is on a steep upward trajectory. There's a lot of great things going on here in Michigan, between the automotive industry, the universities, and I do want to do a shout out for my friends in Ann Arbor, that was a great, great win. In the College Football Championship, we're all proud of them. Well done. But also that I can see that the next great achievement in Michigan is just around the corner, it's going to be in electric vehicles. It's going to be in semiconductors, it's going to be biotech technology. There's all kinds of areas here where we are, because we collaborate, because in Michigan we do compete, but we compete when we need to compete and in the right arena, we collaborate much more than we compete.

E

Ed Clemente 05:33

Once again, our guest is Dean Leo Kempel. He's the dean of Michigan State University College of Engineering. Couple things I wanted to pick out of that what you just said, actually, that, first of all, congratulations U of M. But you're also, I think you mentioned in a pre call, you mentioned a little bit, even though it's sports, but it is actually very beneficial to programs like yours, when you have like sports that sort of is embedded with why students are attracted to universities and then specially engineering maybe, right?

A

Announcer 07:42

You're listening to The Michigan Opportunity, featuring candid conversations with Michigan business leaders and innovators on what makes Michigan a leading state to live, work and play. Listen to more episodes at [michiganbusiness.org/podcast](http://michiganbusiness.org/podcast) or download The Michigan Opportunity through your preferred podcast platform.



L

Leo Kempel 07:42

Right. Part is the whole experience, right? What we really do in a university, regardless of what program you're at, is we transform, typically an 18 year old into a professional. And part of that transformation is not just what you learn in the classroom, and what you do] in student projects and team activities. And I encourage people come to the Design Day that we're going to have in April of 2024, where you can see all the projects our students did over the term and see what kind of great things that they're working on with companies and many of those companies here in Michigan. It's also about the whole person. It's the fact that you learn how to work together, you learn how to collaborate, you learn how to cheer at games, okay, you get that whole experience that's part of being here in Michigan, that's part of being part of the Big 10. And it's part of the value proposition that we bring to families, as they consider moving here to be part of our great economic reawakening. Here in Michigan, we are on an upward trend. It's Michigan up, there's no question about it.

E

Ed Clemente 09:21

Once again, our guest is Dean Leo Kempel, Dean of Michigan State University College of Engineering. You're like a lot of people, myself included somewhat, who has big ties with both at least Michigan State and U of M. You got your degrees from there, I think too, at least PhD and then your masters I think?

L

Leo Kempel 09:38

Correct. There is a little hidden story here, my friend. [Yes.] You know that I'm a transplant from another state and we don't talk about that too much.

E

Ed Clemente 09:47

That you're from another state.

L

Leo Kempel 09:49

There's another state. Yeah, there's another state.

E

Ed Clemente 09:51

I saw you at the University of Cincinnati. I didn't know.

L

Leo Kempel 09:54

But I'm from that state. So you know, there's no question in my mind that things change when you cross that US 23 border.

E

Ed Clemente 10:07

I think it also tells us a little bit about how, what is home for you and what is home for students. I mean, Michigan State, at least in my experience, I was fortunate that there were so many international students, but not just international, people from other states. Yeah, that's how a university I think always gets better too by not just, I mean, I'd love to have Michigan State be loaded with Michigan students. But I think that cross pollination is what really makes a university a world institution.

L

Leo Kempel 10:38

Yeah, so first of all, let me just just tell you that we do, in my college and across the university, have 70% or more in-state students, so Michiganders, but we do have people from across the country and around the world. And that's part of that progression from being just finished with high school, and ready to take on the world and being ready to take on the world. And that is knowing how to work well with others from different cultures, to leverage the experiences they have, and the knowledge they have that quite frankly, you can't know everything. Even a professor can't know everything. And so, the the simple fact is that the environment that we provide in American academic institutions is world class. And it's part of the ecosystem that makes Michigan and our nation world class.

E

Ed Clemente 10:39

Yeah, I can tell you as someone who grew up in a family business whose parents were immigrants, going to a big university, I went to both a small and a big university. But it's amazing how much I decided to start traveling when I met people from other countries and I know Michigan State does a big emphasis on that. [There is, there is.] It's collecting from other countries, but I imagine at your school, you probably have a lot of people that might go over to Europe for something or for cross training.

L

Leo Kempel 12:12

So most students at MSU, do do an international experience. I will be honest with you, probably the lowest participation rate is from the students in the College of Engineering. I've been asked about that for many, many years why, and it's very simple. Most of our students get internships. And so they're given the choice of going out there, and seeing the world and going out there and making a little bit of money there. And learning, is this the path for me., I can tell you, my co-op experience at Cincinnati, told me where I wanted to go, I was not going to be a professor, My father's an electrician, my mother, a homemaker. My goal was to get a degree and make money. I'm an electrical engineer, because my dad was an electrician. That was what I knew, right? I did know how to change fuses at a very young age, I also knew how to blow the fuses at a very young age doing experiments. And we won't go into that because there are things that I, you know, state statute of limitations and so forth. But point is the US public university system allows a person like me to get a great education. And in co-oping, I discerned that my pathway was to get a master's, and make me maybe a PhD. A great public university made that possible. And so now, I'm a professor because of that, but that was not my path. But because our students in engineering go out and practice what they learn. They can

really figure out, Is this my path? Where do I want to be? Do I want to be on the manufacturing side? Do I really want to be on the R&D side? Do I want to be in sales, they can really figure out their path. And that's what makes makes them happy, makes them successful. We have a tremendous success rate here. I love our outcomes in our college, because we're like, 97% of our students have their gigs set up. When they leave us, okay? And we have by far the highest average starting salaries on campus. Well over \$75,000 a year, starting. By the way, Ed, that is my sales pitch when parents come, I say that, I'm done. I will also tell you what I've told my daughters and I've told countless students over the years, if you want to know one question to ask the university, the question is, where do your students go when they're done? Tell me where they go? Give me the outcome data. Okay, and that's going to tell me is this the right place or not? And I can tell you at MSU our outcome data tells people this is the place that I want to be.

E

Ed Clemente 13:23

Yeah. And once again, our guest is Dean Leo Kempel, dean of Michigan State University College of Engineering. So just real quickly, could you mention what the schools are in the college? Like, what are the different engineering disciplines? Or does that put you on the spot?

L

Leo Kempel 15:19

That puts me on the spot, because you know I'm gonna forget one.

E

Ed Clemente 15:23

Well, just name the top three, if you can.

L

Leo Kempel 15:28

We have the kind of traditional engineering programs that are the font of all great engineering colleges across the country. So in mechanical engineering, civil engineering, electrical engineering, those are the big three core. But we also have some very important ones. For the great state of Michigan, we have chemical engineering, we have material science, if you look at those backgrounds, that was a big part of what made the automotive industry what it is. The innovations in those two areas, we have biosystems, because we are the land grant college in Michigan, great ties to agriculture, which is still a big part of our economy. We have biosystems and agricultural engineering, again, an important part that sets us apart because of our mission as a university. We also have biomedical engineering. But we also have things that are part of that growing economy of computer science and another joint department we have with the College of Natural Science, computational math, science and engineering. What's the difference? Computer science is the science of computing, computational math science and engineering is applying computational methods to doing science and engineering. So we think of the backbone technologies that our automotive industry uses to come up with more efficient designs, more efficient manufacturing methods, a lot of those have their basis these days in

high fidelity design tools that are part of systems and engineering approaches are often called model-based systems and engineering. And the state of Michigan is one of the leaders in using model-based systems engineering to transform the way that we do things.

E

Ed Clemente 17:25

Right. And I would imagine, it's obviously a global economy, we are competing, but it's not so much competition, I think in science, sometimes as much as it's building upon other people's work sometimes, or it could be influenced or inspired.

L

Leo Kempel 17:44

So, Ed, I think an important thing is to choose the areas that we're going to be great in. And areas that we're going to be great in are the ones where we have strengths that put us in front of others. Okay. And so in Michigan, we have great strengths in manufacturing, it's still by far, by GDP, the largest part of our economy. We know how to make things. We know how to make things old school, we know make things new school. So there's a lot of work going on there. But we also have great strengths, because decisions were made 20, 30, even 40 years ago, that have put us in the leadership position in certain areas. An example is the Facility for Rare Isotope Beams here at MSU. It's gone online, it's doing great science for the nation. But let me tell you something else it's doing. It provides an opportunity for MSU and Michigan to lead in new areas that are emerging across the nation, like putting more and more satellite capability in orbit. When you put satellites up, you have to be worried about what happens when charged particles from our great sun hit it. And they do. And you can't predict it always, right, there's a certain randomness to it. So we've got the capability in the College of Engineering, working with our colleagues in FRIB, to bring new capacity online for design and engineering for space-based electronics. And so that's the next big thrust that we're pushing. Part of that is going to be the engineering and digital innovation center that we're working on to grow our capacity for training students, and for doing research of high impact for state economic development. That's moving forward. I predict that our 6000 undergraduate students will go up to 8000 within the next few years and that's going to produce more people for our companies to hire.

E

Ed Clemente 19:46

It's something else we touched on. We also talked about how you're actually, me personally as a former state rep even, but how important higher education is to attracting not just students, but just economic people who want to live in this area, knowing there's universities like yours. [Yeah.] And the affordable housing, like you said, or the ability to travel a lot easier. I mean, that plays really well into it.

L

Leo Kempel 20:21

It's really the entire package, we're in the center of the country. And so air travel, as you know, is relatively easy to wherever we want to go to. We've got great technology in this state, we've got great manufacturing capabilities. And we have an ecosystem that again, I'll keep foot stomping, the state's been building this ecosystem, not for 10 years, but for 100 years.

Partnership that I want to do a big shout out for with us, because it does matter so much in economic development in Michigan is with Fraunhofer USA. Fraunhofer USA is based here in Michigan. It is a subsidiary of the front office society in Germany, the great applied engineering entity that the German state set up after World War Two to help we rebuild their country, quite frankly. We've been partnering with Fraunhofer for over 20 years now. And they've been a big part of our planning for how we're going to produce the kinds of engineers and computer scientists and the technology and innovations that companies here in Michigan, with Fraunhofer's help, can move from the idea stage, to the proof of concept to more importantly, what can you make? What can you manufacture in scale?

E

Ed Clemente 21:43

Yeah, we're actually pretty fortunate. We've had Fraunhofer on a while back, Thomas Shulke. And we've also had Ray Boeman on too, with IACMI. And so I guess we're the show that kind of nerdy people like because, because this is not stuff that's gonna be on like TV all the time. But that's why we do this podcast is for exactly the things you're just saying. Because to me, the only future is the future you described, because we can't rest on our laurels, we have to constantly be adapting, AI is going to change the world. [AI will be transformative.] Yeah, semiconductors, how we're going to develop those and how that's going to spread and reshoring. And there's just so many things, you know, in personally, in my life, this is probably one of the more exciting times to see a lot of transformative stuff going on.

L

Leo Kempel 22:38

It is and the great thing is here in Michigan, we're used to rolling our sleeves up and getting the job done. Where you say, Okay, here's the challenge, let's work a plan. Let's work it, let's proceed. And let's check ourselves, make sure we're on track, but show that the we're gonna, with intent, transform the way we do things, and transform the outcomes that we have.

E

Ed Clemente 23:10

So you're gonna be surprised, but we're near the end the show, I just got a couple [That was quick.] Wow, you gave good answers. That's the big [It goes quick.] Well, I think there's other things we can probably do in the future. But mainly, I want you to think of this as a tool for recruiting not just for the university, but for the state in general, even like the you know, U of M football victory. I mean, that all helps us all out because it raises all the boats, right, with those kinds of things. So my questions are to you, is there any other future trends beyond what you've mentioned, that you think are going to be affecting something that we should be focused on or leapfrog over or beyond the ones we've already talked about?

L

Leo Kempel 23:52

Yeah, so one thing that's going to be very important that the quite frankly, the universities have to step up in concert with, with the state and our corporate partners, is the ability to continue to retool our knowledge base. So the old days, okay, I'm not gonna make assumptions on your age there, Ed, but the old days, you went to college, you learn what you need, you got

a career you moved on, right? The new days are I can guarantee you that the accelerating pace of technology is such that every seven to 10 years, you're gonna have to retool a bit. During my career in my research, I've gone from what I learned as a grad student, I don't do that anymore, because the world's moved on, and you have to adapt. And so one thing that we're going to be rolling out are certificates. [Yeah.] That really helped help our engineers that were trained even as short as five to 10 years ago, retool for what they need to know, for their jobs the next five years, and I think that's going to be part of our lifestyle going on, is it won't be the one and done with college anymore. It'll be more of the lifelong learning we've always heard about. But we've got to make that possible. I think technology's helped a lot. But in some sense, the pandemic helped us, we learned a lot of how to effectively communicate and learn at a distance, in ways that it was okay. It really wasn't that great. It was okay.

E

Ed Clemente 25:31

Well, stackable certificates, I think are the way to go based upon the foundation, though of a degree because you have to learn how to learn first.

L

Leo Kempel 25:43

People have asked me, Why do you do so much math in engineering? Okay, what's the point of all that math, you got all these design tools? You got some great things that a lot of them came here from from Michigan to help you do that work? And you know why you do it? You do it, because helps train the way you think? [Yes.] it provides you with a disciplined way to think that that's the true learning. Okay, so you get that basis that you told, but then in the future, you're gonna have to be updated. I also do a lot of work for the Department of the Air Force. I'm very proud of that. And I can tell you this stuff I've done in the last few years, there's no question in my mind, we will be retooling our knowledge across the economy, on a periodic basis for the rest of us going forward, because the pace of change is accelerating so quickly, that you have to. You have to do that.

E

Ed Clemente 26:40

I think the other challenge and I'm gonna end it here, because otherwise we'll probably keep talking, [We'll talk forever.] Yeah, I know, I've got to make sure people will listen forever. So the challenge will be to is that, how do we get the mindset of people to realize how to change, either through leadership programs, or whatever mid-career executive kind of programs to say, the water around you is rising, either be part of the change, or you're going to be left behind.

L

Leo Kempel 27:12

Yeah, yeah. And that's certainly a tough thing. And I'll tell you my my impression of what we need to do, we need to make it bite-sized chunks. If if you told me to go home and prepare a five course meal, the ingredients are all there, just do it. I mean, I'd have a panicked look on my face. Oh, by the way, the internet went down. So you can't go consult. [Right.] Yeah, I'd have a panicked look, but if you told me go home and prepare this one thing, okay, and here's the ingredients. And here's some basic instructions, okay I can go pick that up. So I think making

things in bite-sized chunks, is gonna be very important. And so having, as you mentioned stackable certificates, right, so let's say you start out with a one credit kind of thing to get your toe in and make that stackable so it counts. Do three of those, that becomes a certificate. Few of those certificates become a master's degree or something. That is the kind of thing that lowers that barrier. In engineering, we'd call it the energy barrier. The energy you have to get over, the potential well to do something and let's lower that down. And the key to that is instead of it being a wall, a barrier, you make it stacks.

E

Ed Clemente 28:37

Yeah, I think you and I could just do a show just on that because I think that is going to be pretty relevant for all ages of people, right out of college, all the way to near the end of their careers, they still think about how they reinvent themselves. Anyway, once again, we didn't get to all our questions, but that's okay. It's always a good thing. I want to thank again, our guest, Leo, Dean Leo Kempel, he's the dean of the Michigan State University College of Engineering. You're a wealth of information and a lot of fun. And I appreciate you taking the time to do this with us today.

L

Leo Kempel 29:10

Ed, thank you so much. But I do have to do the required go green.

E

Ed Clemente 29:15

Especially after you gave a compliment. You got to balance out the karma world. Yes. All right. Well, thank you very much. And I'm hopeful we can maybe do something again in the future. [Yeah, absolutely. Thank you.] Join us next week where I guess we'll be Katie MacIntosh. She's a casting director, as well as president and owner of MAC Worldwide Inc. and she does casting for Real Housewives and National Geographic and many other projects.

A

Announcer 29:43

The Michigan Opportunity is brought to you by the Michigan Economic Development Corporation. Whether you're looking for small business resources, exploring an expansion or relocation or seeking a world class workforce, visit [michiganbusiness.org](http://michiganbusiness.org) to learn how you can make it in Michigan.