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Redbird Buzz Episode 17: Tom Keyser, February 6, 2023

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Redbird Buzz

Episode 17: Tom Keyser

February 6, 2023

John Twork 00:10

Welcome to *Redbird Buzz*, I'm John Twork from University Marketing and Communications. Our guest today is Dr. Tom Keyser, the newly named founding dean of Illinois State University's College of Engineering. Dr. Keyser will bring decades of engineering education and industry experience to Illinois State when he officially starts at the university April 1st. He currently serves as the dean of the College of Engineering Technology and Management at the Oregon Institute of Technology. Dr. Keyser joins us today to talk about his background and his vision for Illinois State's College of Engineering, slated to begin enrolling students for the fall of 2025.

John Twork 00:58

It's my pleasure to welcome Dr. Tom Keyser, the founding dean for Illinois State University's College of Engineering to Redbird Buzz. What's the word, Redbird? Tom, tell us a little bit about your personal background and how you ended up in the engineering field.

Tom Keyser 01:13

Yeah, the, um, it's nice to meet you, John, and pleasure to be here. The - my personal background, well, I grew up a kid of a scientist, my father worked in a national laboratory in New Mexico. So seeing scientists and engineers my whole life, I guess that sort of influenced me to pursue engineering, which took me to my first university in New Mexico State where I graduated with my bachelor's degree in engineering, and then received a lot of input from family and friends in the area and ended up pursuing a Master's and PhD, graduated my PhD from Clemson University. And then for the most part, other than a quick stint in industry, where I realized I really liked academia, I've been in academia ever since.

John Twork 02:08

What is it about engineering education that you enjoy so much?

Tom Keyser 02:12

Yeah, you know, it's one of those things where there's long days where you don't know if you're making a big difference, and, but there are lots of things that really are quite rewarding. You know, occasionally I'll still receive an email from a student, I was an instructor 25 years ago, who told me how they enjoyed my class and made a difference and it's a lot of little things like that that make quite a difference. And from the non-teaching side, building programs, seeing students graduate from those programs, being successful, you know, that's where I gain a lot of reward. And I don't, you know, I don't really want to be too far from students, so the dean position is a great position, I can make some broad influences, and in this case, a brand-new college, which is fantastic. And I look forward to doing that.

John Twork 03:06

As you mentioned, you're coming to Illinois State from the Oregon Institute of Technology where you serve as the dean, a role you've held since 2018. Tell us a little bit about your time there and some of the things you've accomplished.

Tom Keyser 03:17

Sure. Yeah, I started in 2018. Here, I have engineering departments, I have technology departments, and I even have management department here that I oversee. It's about, oh, 1500 students plus or minus a hundred right now. And some of the things I've done since I've been here, I've worked very diligently at keeping our enrollment up. I've worked doing a variety of things. I guess, most recently, I was happy to get one of my relationships with Boeing. Some of the vice presidents and assistant vice presidents and program directors there contacted me and wanted to start a program where students can do an internship with Boeing, gain valuable industrial experience, be able to have a heck of a couple paragraphs written on their resume to say, hey, look at the stuff I've already done. And what we're doing here now is I have a lab that's dedicated to that, so students will work on actual Boeing commercial aircraft projects as an intern, but they'll stay right here at Oregon Tech and won't delay their graduation, so it's fantastic opportunity for my students. One of the things I'm most proud of is we do about 97% placement of our engineering students right out of college. We're the, one of the highest paying and I'd say we, you know, I, always one of the things I'm most proud of is my students and this, I think that resonates here at Oregon Tech too, so there's one thing example of something.

John Twork 05:02

You've accomplished a lot there, but last fall you decided to throw your hat in the ring for the founding dean position at Illinois State University. Why did you decide to do that? What seemed appealing about that potential opportunity?

Tom Keyser 05:15

Yeah, this was a question the search committee and Provost Tarhule asked me and honestly I get queries occasionally from recruiters or different things about positions that I might, you know, that people might have interest in me fulfilling or being part of, and I usually just delete them. And in fact, I got an email encouraging me to apply to this position and it just sort of, like most people, you know, these things cycle down in your email and I'd kind of forgotten about it and I got a call from the company that was helping recruit candidates and they encouraged me to look a little deeper and when I looked I'm like, wow, this is really a nice opportunity. It's sort of a once-in-a-career opportunity. It's a college that's, you know, not spawning out of another college. You know, when I interviewed, Provost Tarhule showed me they had the budget projections, budgets sort of already established, we had the John Green Building that was going to be renovated, and it's just an opportunity I couldn't say no to. So the more I was involved in the process, the more this position became more and more appealing.

John Twork 06:28

You've spent the majority of your career in engineering education, like we mentioned. From your expert perspective, as an outsider soon to be an insider, what makes Illinois State University uniquely positioned to succeed with the College of Engineering and why does ISU need a College of Engineering?

Tom Keyser 06:50

So I think the College of Engineering, to answer the second question first, the college will help Illinois State be a little bit more comprehensive. For a college of about 22,000 students and the diverse number of colleges that are there, it's logical that this would be one of the next colleges to be added. And I apologize, I forgot the first question, first part of the -

John Twork 07:16

Well, you're an expert in engineering education, so, you know, now that Illinois State is moving forward with the new College of Engineering, what makes Illinois State sort of uniquely - or is Illinois State uniquely positioned to succeed with the College of Engineering?

Tom Keyser 07:34

Yeah, you know, I think it is. The - it appears there's quite a demand in that area, there's a lot of public support, from everything I've been able to gather, for Illinois State to have a College of Engineering. I've already been contacted by several people associated with the State of Illinois and the university about different things they're excited about. So, you know, having that energy behind it is very important. But I think the, you know, some of the goals that were in the position I agree with very strongly, and one of those is underrepresented groups and trying to make it so we have, make a real impact on that in engineering, because engineering nationwide, only about 14% of graduates are from underrepresented groups and only about 14% are female. So, you know, one of the goals is to make a bigger impact on that and I think we can do that. There's a variety of tools out there that have been proven, but we have the opportunity to build it from the ground up, as opposed to just keep adding things and hoping they work. So there's a lot of research out there on things that work. There's a lot of things that we can do from the ground up, just thinking about curriculum. I'm a big believer in a common first year for engineering. Having that first year, faculty members serve as a mentor right away, so students are very familiar with the faculty. And I really am interested in sort of forming - with most universities you hear about the teacher-scholar model, and I kind of want to change that to be more of a mentor-scholar model. And so I think with, by using that, including project-based learning, projects, having an industry-advised curriculum, I think we have a real opportunity to make an impact, not only for the students, but also for the local industry, because I think we're going to be ready to graduate career ready individuals.

John Twork 09:37

And you sort of read my mind, my next question was going to be about the three pillars that are part of the vision of the new College of Engineering at Illinois State University, and those included, as you mentioned, diversifying the engineering field along with workforce development and student success. Can you just elaborate a little bit on each of those and how you see Illinois State succeeding and achieving those three goals?

Tom Keyser 10:04

Yeah, so I can start with diversifying the workforce. Like I said, you know, nationwide it's about 14% and in the Midwest, it's actually less, it's closer to 10%. At least, you know, statistics from the American Society of Engineering Education is where I get that from. And so we have a lot of ideas that we're going to use, a lot of students support, trying to meet students where they are as opposed to the old model from when I started college, which is students will meet us where we are and if they don't make

it, so be it. That's an old model that I'm not going to support at Illinois State. I know we'll be successful and I know how I'm going to measure that is when other universities come visit us to see what we've done. So that's my goal on that. The career ready, you know, I've worked in institutions, Ohio University, Western New England University, Oregon Tech, those are the institutions that always generated career ready individuals. And so this is really something that I don't know any other way, so, you know, curriculums will be, will have advice from industry, every program will have an industry advisory board, whether that's local, regional, or national, engineers from, you know, practicing engineers giving us input on what they want their graduates, our graduates, to have, as far as tools and skills. We're going to use industry-based senior projects, so when a graduate, or a student, gets to be their final year, they're going to do an industry-based project for their capstone project. And we're going to graduate students who are going to graduate from a ABET-accredited program, so all those assessment processes will be built into the program. So if a student wants to be a professional engineer and practice on their own, you know, one of the requirements for that is they graduate from an ABET-accredited program, so. And then there's - what was the third pillar you mentioned? I'm sorry.

John Twork 12:06

Well, student success, and you spoke about that, but workforce development, which, you know, is led to by student success, I would think.

Tom Keyser 12:13

Yeah, yeah, exactly. Yeah, and a lot of this is going to be related to the hiring process, so, you know, right now I think I'm the only employee of the college. I know there's, we've started advertising for our department chairs and shortly after that we'll start getting some of our initial faculty. Having that faculty represent what we want our students population to be like is going to be important. Statistics show and data proves that what your faculty look like basically constitute what your student body's gonna look like in your college. So those hires will be people that believe in having career ready individuals when they graduate. There'll be a diversified faculty, so we'll have faculty from underrepresented groups proportionately where we want our goals to be, same thing for female engineers. You know, and also, we're going to do things like entrepreneurial partnerships, so we want our students to sort of have that curiosity, where can we take that next? You know, we are given a problem, but how can we take this further, right? How can we satisfy a customer demand? And so we'll have those students ready to solve problems, trying to keep the customer in mind on what the problem is and what their needs are.

John Twork 13:30

Following up a little bit on workforce development, it's hard to talk about engineering in Normal without considering local manufacturing and electric vehicle maker Rivian, for example, four miles away, and then, you know, you've got Caterpillar based out of Peoria and so forth. Can you talk a little bit about, you know, your personal experience with, you mentioned partnership with Boeing where you're at now, and how you plan to engage with community partners with the College of Engineering?

Tom Keyser 13:58

This was some of my - you know, I'm not from Illinois, I lived in Ohio for a short time, that's as close as I've been. So a lot of my initial efforts are going to be, I'm going to be outward-facing quite a bit for the first few months there, whether that's meeting local industry, local leaders, community leaders,

legislators, you know, any friend of the university is somebody I'm going to want to talk to. And, you know, really with having career ready, I mean, if, you know, we have two departments and I really, these would be the two departments I would have picked, electrical engineering and mechanical engineering. You know, I've heard several people say, and it has some truth, the whole world is electro-mechanical system now. You know, it used to be a car was very mechanically-oriented, but anybody that drives a car now is constantly interfacing with electronics. And when we talk about electrical, the electric vehicles, well, you know, we're not having a combustion engine anymore, we have electrical power train and all of those systems that it operate. So I think the two programs we have started, or the two departments we're gonna have, I think having them interface right from the beginning is going to be a very unique opportunity and I think we can really do some things with that to really kind of satisfy what our local needs are.

John Twork 15:16

You mentioned you would have picked those two if you - but those had been decided on before the dean search was underway. But can you talk a little bit for, you know, this is an audience not fully of engineers, what is electrical engineering and what is mechanical engineering and why are those two great programs for the college to start with?

Tom Keyser 15:36

So electrical engineering is very interesting because they've branched out so far into so many areas. So electrical engineers, you usually think of circuits and resistors, and sort of the standard sort of electrical things, and maybe even some of the things in your home, but electrical engineering has branched out to be, to include artificial intelligence and machine vision and renewable energy and solar cells and all sorts of things. And how do we store electrical power, whether it's a battery, or there's all sorts of other ways to store it. So electrical engineering is going to be very diverse and very dynamic in how we want to use it as far as in our curriculum and how we want to focus it toward the industry needs the area. Mechanical engineering is traditionally the largest engineering department in any college of engineering, its - students seem to gravitate toward it, they really liked it and it's a little easier to visualize than electrical engineering. You think of a car, you think of almost anything you see moving, you know, mechanical engineering is typically involved in that, whether it's an airplane, or a car, or a toy, you know, whatever it might be. But again, all those devices, gears, pulleys, whatever you want to look at, are all controlled now electronically. So, you know, those two departments, they're linked very strongly and it will continue to be so.

John Twork 17:11

So you start with those two, would there be the potential to expand in the future?

Tom Keyser 17:16

Yeah, we'll have to see what the students' interest is and what the local industry interest is. There's a lot of possibilities for maybe a master's program and either, or a combination thereof. There's always some natural things, like renewable energy is sort of, it can be sort of, I like to think of it as a cross between electrical engineering and mechanical engineering. How do we capture power, say if it's from the sun, if you want, or from hydrogen or from, you know, different sources and then how do we convert that to power, right, it has to go through a transmission and has to be, you know, all of those things. So

I'll be interested to talk to local industry and see what their needs are. I think any new program is, you know, perhaps a couple of years down the road and I'll need to get my feet on the ground in Illinois to see what the need that is out there for us to satisfy.

John Twork 18:15

You mentioned that the two programs at times may be even overlapping, and it seems to me, just hearing you describe those programs, you know, there may be some existing courses and have you thought at all about, you know, the opportunity for some cross-campus collaborations as you arrive and begin the College of Engineering?

Tom Keyser 18:37

Yeah, absolutely. Absolutely. There's all sorts of different things that we can collaborate on. I can give a couple of instances of what's happening here between our electrical engineering department and our mechanical engineering department and different things. So we have a couple projects that my students and faculty are working on with respect to how are we going to go about - we have a large lake here next to Oregon Tech that has an algae problem, which sort of renders the lake non-recreational, shall we say, for a couple of months because of the byproduct of what happens with the algae in the lake. And so how are we - we're looking at how do we remove that algae and so I have, I've had faculty work with the local Native American tribe here, I have them working with our biology and chemistry departments on different solutions and how that will work, so that's one instance. We have a lot of ability to do 3D printing here, whether it's metal, ceramic, composites, plastics, and so right now we have a medical imaging program here and so we're busy building models for them to have the students be able to do different imaging from different angles. In addition, we also have a dental therapy program here and so we're printing teeth, we're doing a variety of things for that. So it's really rewarding for the faculty to get out and experience that. You know, we obviously have the natural connections with chemistry and physics and mathematics. A large portion of engineering curriculums involve calculus all the way through differential equations, we have at least two or three physics courses involved and we have a chemistry course. And when we talk about 3D printing, a lot of its material science, which is, you know, we have chemistry, we have some physics involved, so lots of crossovers that will be available. And we look, I look forward to seeing what we can develop with that. And then, on the search committee, we had physicists, we had technology, and so we've already started, you know, excited to look and see what we can do.

John Twork 20:51

Well, speaking of being excited, I know there's probably some prospective students in high school right now who have their sights set on engineering, and now Illinois State is an option. University targeting the fall of 2025 for enrollment for the first class. For prospective students, you know, what are kind of the steps as far as if they fit into that window, you know, what should they be doing, when should they start applying and that kind of thing?

Tom Keyser 21:19

So, you know, this whole next year will be a planning year for us and we'll be, you know, talking about and trying to be public about where we are in the process. But students should be, if they're interested in being an engineer and coming to Illinois State, you know, I'll encourage them to visit campus. Our

building won't be quite ready for the first couple years, but they can watch the planning and I'm glad to show the drawings and all the different students' faces. But, you know, in general, and I think this will, for the most part, be true, students should be ready to take calculus class or precalculus, depending upon which major they choose. So, you know, study your mathematics, be familiar with chemistry, be familiar with physics, and be well-rounded. The, one of the things are, we have an accrediting body called ABET and they develop our, what is an acceptable engineering curriculum and they'll assess that. But with some of the things in there, you know, since 2000, have been what they call the soft skills, which is not my favorite term, but communication, teamwork, all those sorts of skills are more and more important to engineers every day. The days of an engineer sitting at their desk just plugging along on their own, those are in general few and far between. Engineer will do that, but they'll also be part of a team and, you know, projects are more and more complex and it requires a team of people to to accomplish it, so.

John Twork 21:19

Some good advice for prospective students. And speaking of prospective students, you know, what would be an advantage to joining a brand-new program and becoming a part of, you know, the first class of students in a new program versus maybe pursuing a degree at an established institution and college of engineering?

Tom Keyser 23:16

Yeah, so for new students, you know, the, perhaps there's a little worry that it's, that they're not going to be as well equipped as others, or students that are entering a new program. Well, it is our goal and we will make this goal that we will be ABET-accredited, just like all the other institutions that, across the country and actually internationally, and what that means is you'll have the same, I like to use, you'll have the same basic toolkit as anybody else and you'll have the same abilities as everybody else that graduated from other schools. As far as a new program, you know, why? Well, you know, we're, you're going to have very personalized attention at Illinois State, where we're planning on no lab sections of less [more?] than 20 or 25 students. You'll still have the same courses as other engineers, you'll still take circuits from electrical engineering, you'll still take thermodynamics from mechanical engineering, all those courses will be the same, but I think you'll have a unique opportunity to work closely with the faculty. The curriculum will be industry-informed and industry-driven and I think you're gonna, you know, one of the things I mentioned earlier is I want my engineers to be, have sort of an entrepreneurial mindset. I want that curiosity, I want them thinking about, okay, you know, what does this mean? What if I design it this way? What, how does that impact people? What kind of connections do I need to have to make this project work? I think Illinois State will have a great engineering program and I encourage everybody to come.

John Twork 24:50

You arrive April 1st, and I'm sure you have a long to-do list already made up for, you know, your first week, month, six months on the job. What are some of the things on your list for that, let's say first year? It's got to be a long list, right?

Tom Keyser 25:06

It goes on and on. You know, my first concern is going to be to hire the two department chairs. And I know the, it's been advertised. But those two individuals will be key to our success. They'll drive more of the programmatic details. I need to go out and meet people, as I said, I need to be outward-facing, you know, if we're going to be industry-informed, I need to be out meeting industry. So I'll be knocking on a few doors. I need to find who are our supporters of our college, I need to engage with them. Resources, whether that's time or money, are going to be important to the success of the college. And then I need to reach out to community colleges and high schools and let them know what we're planning, why they should come here, and let them know about Illinois State's new College of Engineering.

John Twork 25:57

Well, we're looking forward to your arrival and watching all of the progress leading up to the fall of 2025 when we launch this College of Engineering here at Illinois State. Dr. Tom Keyser, thank you so much for your time today.

Tom Keyser 26:11

Thank you very much. Oh, we're launching on April 1st, just we don't have students till fall of '25.

John Twork 26:15

That's right. Yes, exactly. Looking forward to watching the progress. Thank you so much, Dr. Keyser, for your time.

Tom Keyser 26:23

Thank you very much. It was a pleasure to talk to you.

John Twork 26:32

That was Dr. Tom Keyser, the founding dean of Illinois State University's College of Engineering. Learn more about the College of Engineering and follow the college's progress at IllinoisState.edu/College-Engineering. Thanks for listening to *Redbird Buzz*, and be sure to tune in next time for more stories from beyond the quad.