Oklahoma Innovations Radio Show

Air Date: August 23, 2009

Guests: **James Long** and **Trevor Snyder**, Integris Advanced Cardiac Care Program

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>> From the OCAST Radio Network, this is *Oklahoma Innovations*, a weekly science and technology radio magazine brought to you as a service of OCAST, the Oklahoma Center for the Advancement of Science and Technology. OCAST is the state's only agency whose sole focus is technology, its development, transfer, and commercialization. OCAST mission is to identify and fund promising research in technologies that allow Oklahoma to compete in a global market economy from our own backyard. This program features some of the state's most gifted and talented scientists, inventors, entrepreneurs, manufacturers, and business leaders who all have one common goal, developing technology-based economic growth for all Oklahomans. Now here are your hosts, Gary Owen and Steve Paris.

>> That would be the voice and . . .

>> . . . That's right. The brains. He makes he say that every week.

>> I don't make you say it every week. I'm just having fun. How are you?

>> Doing great, Gary. And you?

>> I've had a good weekend. We had some nice weather this past week. It's kind of tempering out a little bit. Had a little rain. Gosh, I can't believe everything looks so green all of a sudden.

>> I'm mowing my yard every five days. Could do it every three probably.

>> My wife is happy with our garden, we have roses turning around every couple of weeks and it's just been -- wow.

>> I just love these little spring time thunderstorms. They come through and knock out the electricity at my house, which you know, I showered this morning almost in the dark. So --

>> Did you?

>> I did.

>> We thought you were still on butane fuel on there.

>> No --

>> I tell you what, every now and then -- it doesn't happen often, but it happened this morning.

>> So what's going on in the world of OCAST.

>> I tell you what, in OCAST we've got so many things going on dealing with nanotechnology, and we're looking at some -- maybe modifying some of the things we've been doing under our own program. We'll talk more about that later, and that's the Oklahoma Nanotechnology Applications Program. We also have a lot of our research projects are really underway. Of course, we're kind of in the month, the later part of the summer, and a lot of the professors who work on these projects, who are the principle investigators, some of them may not be at the universities, but a lot of them continue the research over the summer months. And so we kind of keep up with that and watch what they're doing, from the standpoint of keeping in contact with

them because there's certain triggers in each one of those contracts that says all right, it's time to advance them some money. And that's kind of what we do. About three times in the course of a two or three year, you know, research period for health research, applied research, and some of the different areas. So our team is working very closely with those researchers. Not helping them do the research, because that's not what we do, but helping them maintain -- make sure that they're up-to-date on the contact and where they're supposed to be. And that's usually a phone call or a site visit where you know, if you have any problems with this, and things of that nature. It's an effort not to -- to kind of keep a whip after them or anything like that. It's a cooperative effort so we can help them if they're having some difficulties we kind of maybe knock down some of those barriers for them.

>> So see folks, they don't just take your tax dollars and say, "Oop, have a good time."

>> Nope.

>> It's very carefully monitored to make sure everything is okay.

>> You bet it is.

>> Keep them on track.

>> It's peer reviewed before it goes out the door.

>> Any calendar events we need to know about? I know that we've got a conference coming up pretty soon we're going to be at next month. What's that?

>> Manufacturing Alliance. One of our strategic partners created in 1992, and I remember because I called the first press conference for them.

>> Did you?

>> Sure did. Back in '92, and Governor Walters was governor then, and came out and announced the creation of the -- back then we called it the Oklahoma Manufacturing Alliance Inc. -- OMAI, I believe. I left something out there, it's been so long since we called them that. But it's been shortened to the Oklahoma Manufacturing Alliance. Very quickly, why do we do that? Well, it's a bit of an extension program much like they've had in agriculture except in this case we're trying to help Oklahoma manufacturers remain competitive so that they can keep their doors open, keep Oklahomans working. And that's -- we've had a lot of success in doing that. Mainly through our people teaching them how to do lean manufacturing, and six sigma, all the different terms that you hear associated with the manufacturing process.

>> And it gives them the edge to be more competitive in this global market. So the economy is the way it is right now, they need all the help they can get.

>> That's exactly right.

>> All right, well it's that time of our show where we do science news. And we've got a couple of new bumpers.

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>> The U.S. plans to return astronauts to the moon by 2020 if they have the budget to do so. Right now scientists are saying maybe not. They need a big boost to NASA's budget, leaving only the space station as a viable target for the country's human space program. According to presidential review panel the human space flight plans committee which presented its

preliminary findings to the White House on this last Friday, about a week ago Friday, concluded that a human mission to Mars currently could be too risky. Developing new space shifts to replace the retiring space fleet, the space shuttle fleet, rather, and bigger rockets to reach the moon would require about $13 billion more per year. The panel headed by former Lockheed Martin chief Norm Augustine has said that the only human space program affordable under NASA's existing budget is an enhanced space station, one that has a side benefit of seating a commercial passenger launch services market. And right now NASA spends about half of its $18 billion budget on human space flight to fly the shuttles. The partial remains of an ancient tooth-whale species that roamed the ocean five million years ago have been discovered on a California beach. Crews removing a 1,000 pound slab of sandstone off the Santa Cruz County Beach discovered the remains about a week-and-a-half ago and called in paleontologists. And the one they got a hold of, Frank Perry, with the Santa Cruz Museum of Natural History. He says the remains are an important piece of a puzzle that will help understand what life was like when meet-eating toothed-whales roamed the shallow seas that once covered the region. Their descendants include the Orca and dolphin, of all things. IBM is looking to the building blocks of our bodies, DNA, to be the structure of next generation micro chips. As chip makers compete to develop ever-smaller chips at cheaper prices designers are struggling to cut costs. Artificial DNA nano structures or DNA origami as they call them, may provide a cheap framework on which to build tiny microchips, according to a paper published in a recent edition of the *Journal of Nature and Nanotechnology*. Scientists say they discovered a gene that helps a mother and daughter stay alert on about six hours sleep a night, two hours less than the rest of their families. They're saying that this is believed to be a very rare mutation, not an excuse for the rest of us to stay up late. But the finding published in the journal of science last week offers a new lead to study how sleep effects health. And here's a good one, a widely used blood pressure drug may hold promise as a treatment for multiple sclerosis. Lab tests found the generic drug lisinopril, I believe is the way you pronounce that, is that right? Lisinopril. I think that may be right. Anyway, it's developed my Merck, and they're saying is quite powerful and could even reverse paralytic disease in mice. Wouldn't that be something, if they find a treatment for MS. Scientists say they found a big reason why treatment for chronic hepatitis C infection works better for white patients than for African Americans. They say it's a tiny variation in a gene. Can you believe that? And well here's one for you.

[Music]

>> A cluster of UFOs over Britain in 1996 may have had more to do with public fascination with TV shows like the X Files than extraterrestrial activity, according to files released by the National Archives. Documents from Britain's Ministry of Defense indicated there were 609 UFO sightings in 1996 compared with 117 in 1995, this coincided with the rise in popularity of the X Files, and release of the blockbuster film Independence Day. The files would span 15 years and contain more than 4,000 pages show that for most cases the UFO sightings had ordinary explanations such as bright stars, planets, meteors, artificial satellites, and balloons. In one incident in 1995 two men in the midland county of Staffordshire told police they saw an alien with a lemon-shaped head emerge from a hovering UFO and said they told them we want you to come with us. Didn't you have an UFO experience like this once?

>> Oh yes.

>> Yeah, okay. Anyway, see, we all knew that was kind of hodgepodge in there. Now Ladies and Gentlemen, it's time for innovations in history.

>> Hey, thank you Gary. It was 98 years ago the Proctor and Gamble Company introduced Crisco shortening. This month marks the 174 anniversary of the ranch, patented by Solyman Merrick of Springfield, Massachusetts. And the 109th anniversary for the patent for the dial tell phone. Evan Prescott obtained a patent for the first loop-de-loop roller coaster on August 6, 1898. It was built of all places, Coney Island, New York, two years later.

>> Wow.

>> And the patent for the electric starter for automobile engines was issued August 17, 1915. First two-way radio communication from a plane to the ground was on August 18, 1917. Gale Borden produced the first condensed milk on August 19 in 1851, and America launched an unmanned space craft named Voyager 2 on August 20 -- it was 31 years ago, carried a 12-inch gold-plated copper disc containing over more than 100 images, greetings in 55 languages, music from Bach to Chuck Berry and the Beatles, and other sounds, from planet earth.

>> And those are just a few of the remarkable innovations in history for the month of August, my friend.

>> That's funny. Well, if you or someone you know in your family has heart problems today's show may intrigue you, we're going to be talking with some fellas from Integris Health, and some interesting technology going on there. You know they say every 34 seconds heart disease claims another life in the United States. It's the number one killer in the country and in the state of Oklahoma. Did you know that?

>> Actually, I did know that. That's something we'd sure like to change too?

>> Does it have to do with our diet, our lifestyle, you know?

>> Let's ask the experts here in a minute.

>> I tell you, because that -- every time I hear someone having heart problems I think okay, let's take a look at our environment and diet. They used to say that Oklahoma was one of the biggest test markets for fast food.

>> Oh really.

>> Yeah.

>> Dubious distinction.

>> A lot of fast food chains come in and that's why we've got so many of them I guess. I don't know, but anyway. We've only got a minute before our break. So let's talk about who our guests are.

>> Let's do that. We have Dr. James Long. He is a -- he's a medical doctor and has a Ph.D.. He is the director of Integris Advanced Cardiac Care. And that is with Integris Baptist Medical Center in Oklahoma City. And he and his colleague Trevor -- Dr. Trevor Snyder, who is an Oklahoman.

>> He's a bio engineer.

>> Bio emergency, research development of chemicals, circulatory support program, research scientist, among other things, he's also a teacher. And he's a native of Tulsa, Oklahoma. And these gentlemen are here to talk with us today. We're not going to give you much of a chance to talk right now, but they're here to talk with us today about -- well, specifically about activities

and devices that effect heart transplants. And it's a bigger story than that, but we're going to let you tell it in just a minute.

>> All right, well I tell you what, we'll be really interested to talk to these guys, and I tell you it's fascinating what's going on in medical technology today, and new innovations in medical research. We'll talk more about what's going on when we return on *Oklahoma Innovations*.

[Music]

>> As you drive across Oklahoma you can see thousands of gas wells sprinkled throughout the country side. Many of these wells don't produce enough natural gas to justify pipelines. But without this access thousands of well sites are abandoned. With the support of the Oklahoma Center For the Advancement of Science and Technology one company is creating a portable device transported on a flat bed truck to process natural gas at well sites. This technology optimizes the amount of gas that can be captured and releases no by products into the atmosphere. This idea provides new opportunities for small oil and gas producers while bringing us one step closer to energy independence. Supporting innovation. That's what OCAST is all about. OCAST is looking for small business owners serious about investigating new products, services, and processes. For more information call OCAST toll free at 866-265-2215, or visit their web site at ocast.ok.gov. Investing in research and development, it pumps new life into Oklahoma's economy.

>> You're listening to *Oklahoma Innovations*, with Gary Owen and Steve Paris, on the OCAST Radio Network.

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>> The Integris Advanced Cardiac Care Program, headed by one of our guests, Dr. James Long, is waging war against this disease by offering new hope to advanced heart failure patients. And we say this disease, we've been talking about prior to the break about heart disease and I don't know of a family in this state, in this country, that isn't effected by heart disease in some fashion. Either by a relative, close friend, or what have you.

>> That's exactly right, Gary. We have with us Dr. James W. Long, and as you indicated he is the director of this program at Integris Baptist Medical Center. Before we get into that, Dr. Long, I want to hear more about who you are, so that our audience can understand -- our listeners can understand who they are hearing from. Because you have quite a career behind you, and I suspect one that you're going to finish up some years from now. Tell us about who you are and how you got to be in this position.

>> Well, Steve and Gary, we're delighted to be here. We're impressed with the innovations going on in medical technology in Oklahoma. So it's an honor to join you here this morning. I'm a cardiac surgeon by background. Also a researcher, and have specialized specifically in the area of heart failure, introducing a number of advanced heart failure initiatives, bringing it to Oklahoma, have had some contact with Oklahoma in the past that made me excited about opportunities here. And also aware of the needs. So just delighted to be here with you this morning to talk about this very important subject.

>> Very good. And you came from Utah, if I understand. To Oklahoma from Utah, is that right?

>> I did. Was in Salt Lake City for about 20 years, and --

>> Oh, nice city.

>> Actually it's a beautiful city, it's got gorgeous mountains, we lived in about 20, 25 minutes from some of the best skiing in the world.

>> Park City.

>> Park city is a bit commercialized. We enjoyed some of the off terrain area. But you know, spectacular. Don't see much of that here. We're getting used to getting ready to face the ice storms a bit.

>> Well, I hope we can avoid those.

>> Yeah, absolutely.

>> Very good. Well let's talk about your technology. I'm going to ask -- I'm going to go down kind of a list here that's been created. You've created -- been involved with the development of a device called a VAD, a Ventricular Assist Device. And that's been kind of one of these breakthrough technologies, doing some wonderful things in the various stages leading up to heart transplants and things of that nature. Talk to us about VAD.

>> Well the VAD as you said stands for Ventricular Assist Device. And that really is the modern version of what we would call artificial heart technology. Now many of your guests will remember back in December of 1982 when the world first faced the opportunity or the expectation, if you will, that artificial hearts were finally of age, and back on that December night Barry Clark was wheeled through the hospital halls to get to the operating room, and had implanted the Jarvik artificial heart. World came to believe this was it. We finally arrived. We can create a bionic man with an incredible artificial heart technology. And while it was very sophisticated we recognize today that it was really ahead of what it was capable of delivering. This was air-driven technology at that time, requiring 400 pound massive console outside the body that the patient had to be tethered to by about a 12 foot set of pneumatic drive lines. And while it did give the patient life it certainly isn't quality of life.

>> And it wasn't very long either.

>> Well, it was a three month experience. And it was tough. Barney Clark was not the right candidate for this, to start with. But the technology wasn't really able to deliver at that stage. So today we've moved away from these total heart replacements for the most part. Although that still is an important part of our field, and there still is technology out there to miniaturize that from these big huge pneumatic systems to electrical systems. The vast majority of our focus today is now directed to these VADs or Ventricular Assist Devices. These are remarkable pumps that can be implanted inside the body, and hook up to the heart leaving the native heart in place. But we can actually divert the blood away from the weakened left ventricle, which is the portion of the heart that suffers the most in heart failure. We can divert the blood away from the left ventricle, put it through these remarkable pump easy, and return it back to the body. Essentially substituting for the whole entire workload of the heart. We no longer have to take the heart out, no longer have to replace the heart completely with the use of these -- we've been able to advance the field much farther and much faster by the use of VADs.

>> Two different types of devices that you use? I'm reading -- looking at the simple descriptions here.

>> Yeah, the first technology we're talking about or the total artificial hearts are complete heart replacements. We are now, however, as a field, focusing mostly to the ventricular assist devices.

There's still a utility for the artificial hearts, but the Ventricular Assist Devices do come in a couple of categories. We had a first generation of these technologies that we started in the mid 1980s with and continued -- have continued using them even onto the present day. But these were large, these were approximately five inches in diameter, three inches thick. They had motors in them that made noise, they vibrated. While they were very good technologies and we saw some excellent promise for the field through those, we're very excited about the new generation of technology that we have that miniaturized that now. We no longer use pump that's have to pulse the blood, but we use pumps that continuously flow. Because of that we can get to a miniaturized pump that's easier to implant, much easier for the patient to manage. These are quiet, silent, vibration-free, so really represent a remarkable breakthrough, finally giving us what everybody in 1982 was hoping for, and that is quality of life that comes with mobility, return to work, getting back to the recreation-like duty. We don't make athletes out of these folks, but we certainly take them from their advanced heart failure state, terribly debilitated, reinvigorate them with these marvelous technologies.

>> Any rejection issues with the technology so far?

>> Yeah, that's a very good question. These technologies are designed to be relatively inert. In fact, one of their advantages over transplantation, they're not yet ready to replace transplantation, let's make that clear. But one of their advantages over transplantation is they don't require the anti rejection medications that a heart transplant recipient requires.

>> Hold it right there. We're going to come back and talk more with our guests from Integris when we return on *Oklahoma Innovations*. Still got to get Trevor Snyder in here to talk about bio engineering in this field. More to come, on *Oklahoma Innovations*.

[Music]

>> There's more to learn to *Oklahoma Innovations* with Gary Owen and Steve Paris on the OCAST Radio Network.

>> The stress of finding a job after college is compounded for recent graduates entering a tough job market. But thanks to the Oklahoma Center for the Advancement of Science and Technology more students connect with the state's most advanced technology companies while earning income and valuable on the job training. Through the OCAST R&D internship program, students gain experience in the industry, work with mentors, and operate specialized instruments. Intern training leads to starting salaries 12% higher than Oklahoma's average per capita income. OCAST is investing in Oklahoma's best and brightest. Creating jobs, investing in our future. That's what OCAST is all about. OCAST is seeking intern partnership opportunities that will allow Oklahoma students to gain hands on experience in science and technology careers. For more information call OCAST toll free at 866-265-2215, or visit their web site at ocast.ok.gov. The future of Oklahoma looks bright.

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OCAST is looking for small business owners serious about investigating new products, services, and processes. For more information call OCAST toll free at 866-265-2215, or visit their web site at ocast.ok.gov. In a state deeply rooted in agriculture, plant science helps Oklahoma farmers grow their business.

>> Research and development, technology transfer, and commercialization creating high paying jobs in Oklahoma is what OCAST is all about. This is *Oklahoma Innovations* on the OCAST Radio Network.

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>> Thank you for joining us on this week's edition of *Oklahoma Innovations*. This week we're talking about Integris' advanced cardiac care program headed by Dr. James Long, one of our quests. And in a moment we're going to talk with Trevor Snyder, who is a research scientist and bio engineer -- engineering -- in research, and development. We're talking about new technology, relatively new technology being used to help heart failure patients. And before the break Dr. Long, you were talking about -- I asked you a question about the rejection of such devices. And I didn't know if you were through with your thoughts there, but I wanted to give you an opportunity to finish up any final elaborations that you have. Because you know, that's one issue that patients have. You put this thing in me, but is it going to kill me. You know that kind of anything.

>> Absolutely. Important question. This day and age transplantation has actually been the gold standard for end stage heart failure. When you run out of other options you're either left to make it on your own and likely die, or you could undergo transplantation in this whole new field of mechanical circulatory support using these remarkable VADs is now evolving. The problem with transplantation is we've only got 2,000 hearts available for the entire country each year. That means 6 hearts today for probably 5,000 on the waiting list. And there should be as many as 50,000, maybe more than that, 2 or 3 times that on the waiting list with end stage heart failure. So hence the needs for these devices, like the VADs.

>> And on that subject is there an age point where you say you know, this is probably not going to help you.

>> Transplantation has generally used the age 65 as the cut off point, although that's being stretched a bit, as we're learning how to use these marvelous technologies.

>> I'm sure a lot of it is the overall health of the patient as well.

>> Absolutely. That's very important. The beauty of having a technology that's not so resource limited like transplantation is, is it allows us to push the envelope, and we're actually explore -- pushing that age limit even more so than we can with transplantation, now with these mechanical devices.

>> I was looking through your material, Dr. Long, and I saw the word bridge show up several times. And I'm assuming that the VAD could -- could be a bridge between where you are now and where you might be at the point where you can receive a heart. Is that the concept?

>> Absolutely. That's how we started using these technologies, until we got some experience with them. We began using them as bridges to transplantation, holding patients for weeks to months, and now even sometimes years while we're waiting for these hearts to come available to us. The new innovation in the field is a push beyond just that limited utility and now push it into

permanent life-long therapy. And within the last five years we've really opened that door um in a remarkable way. These technologies have proven themselves to have sufficient quality that we want people to go on for years and years and years with these. Even when they can't get a heart transplant.

>> You touched on something a little bit -- last segment, about what you can do if you have one of these VADs, you know, if you're living with one of them. You can travel by airplane, commercial boat or car, you can mow the lawn, garden, other yard work, you can work with properly grounded power tools, that's important, has to be properly grounded. Exercise, like walking, biking, short hikes, you can go to movie theaters, dinner, take a shower.

>> But can you be around a microwave oven.

>> I don't know.

>> Yes, you can. We want people to look like they're fitting back into society.

>> That's an important, important thing, as far as quality of life goes, for folks who have to undergo this type of procedure.

>> Absolutely. This day and age we can't just extend life without quality. Quality outcome is absolutely central to successful application of this technology.

>> Steve, let's get our next guest involved here.

>> Let's do that.

>> That was my next step. Dr. Trevor Snyder. He was previously a clinical VAD engineer and director of the clinical bio capability laboratory at the University of Maryland School of Medicine, and you joined Integris of October of 2008. So you've been here less than a year.

>> That's correct.

>> But we haven't given you a chance to give us your pedigree. And the main part of that pedigree is you're a native Tulsan.

>> Yeah, I'm an original Okie. So -- gentlemen, thank you very much for hosting us. We really appreciate it. I was born in Tulsa, Saint Francis Hospital, and grew up there, went to Jinx, and then switched over to Holland Hall for high school, but earlier, Dr. Long had mentioned the Jarvik-7 device, the total artificial heart back in the early '80s. And as a precocious 8-year-old I became fascinated with that and decided that's what I wanted to work on for my career. And so then pursued that, and unfortunately at the time there really wasn't much in the way of artificial heart technology and use here in Oklahoma when I graduated back in '93. So I left and went to Tulane, graduated from there and went up to Pittsburgh that has a renowned artificial heart program. And really got to learn and begin working with patients there. And was taken by the need to improve the -- what we call the bio compatibility of these devices. How this device interfaces with patients. Ended up spending time there and then went to Maryland. But when they found out that Dr. Long, who's a bit modest, but he's an internationally renowned expert in this field, when I heard that he was moving to Oklahoma City and going to set up a Ventricular Assist Device program I knew that I wanted to be part of that and wanted to come back in Oklahoma. So in the future when there is little precocious 8-year-olds who want to pursue, you know, other heart disease techniques and things, they can stay here and do those things here and don't have to leave and go to the east coast.

>> And we need to encourage every one of them. Absolutely right. And you -- talking about young people, you were involved on a project called the Pediaflow project in Pittsburgh, where you developed the systems for infants and small children. That concept -- until I read this, that concept never occurred to me. And I bet it's much smaller, right, the device is?

>> Oh yes. There's the NIH -- National Institute of Health, had a program where they funded several contractors to try to develop these miniaturized blood pumps for babies, basically. And these are for children who are born with either some kind of congenital heart defect or for whatever reason develop heart failure. And so there are several different groups who are working on this. But we were working on a pump and that development is ongoing today. So that device is about the size of a double-A battery. And it really is the leading edge of where this field is moving toward. The original Jarvik-7 is kind of -- it's roughly the size of a softball, and we're looking at not just the pumps for babies, but some pumps for adults, even, that use some lower flow rates, and we put in patients before they get quite so sick that are on that scale. So you're talking about a double-A battery instead of putting a softball, in someone. And of course that -- that opens up the field to helping a much larger number of patients each year , which is our ultimate aim.

>> Now had you met Dr. Long before you came back? I'm sure you had, somewhere.

>> I had met him actually formally when we worked on the Pediaflow project, but I had been reading his papers for years before then, and he was one of the lead investigators in a crucial trial in our field that was called rematch. And that's where they compared using one of these devices, it was called the Heartmate device, in comparison to just using medications that the cardiologists have available to manage heart failure patients. And the key finding in that trial was that the device could provide a longer life. The question was the durability of the device. But that -- that trial opened up this use of what we call destination therapy. We need to be more creative with these names. Destination therapy sounds like you've come to the end, but it really is a new beginning. So instead of using transplant you can receive one of these devices and that's your treatment for the rest of your life for heart failure.

>> Very good. You know, all this is going on right now, from here forward, at Integris Advanced Cardiac Care. And that's where you gentlemen are both -- are both involved in your research and you're actually having -- doing operations, you're implanting these devices in people. I noticed, Dr. Snyder, that you supported more than 250 VAD programs, where you've had total artificial heart implants using a dozen different devices. So I guess you're kind of operating -- I hesitate to use the word engineer, but it was kind of an engineering process. Is that --

>> Right. I was part of a team in Pittsburgh, and there were two of us in Maryland. But we were -- we provide the engineering support that goes along with these devices, so they have controllers that we have to monitor. You allow the patients to hook up the batteries so they don't have to be plugged into the wall all the time. And our patients thoroughly use and occasionally abuse their equipment, and we need to figure out what's going wrong with them. There's things about adjusting settings that we can do so that they -- the devices work better for our patients. And then overall, we look at -- look at reducing strokes, infections, things like that. And the key part for an engineer is if you work bed side with the patients you see what the problems are and how those need to be addressed to improve things in the future.

>> We're certainly learning a lot about new technology for heart failure patients. We have a lot more to talk about with this wonderful innovative technology being developed and used by Integris, when we return on *Oklahoma Innovations*.

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>> This is Oklahoma Science Radio Magazine, *Oklahoma Innovations*, with Gary Owen and Steve Paris, on the OCAST Radio Network.

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>> Gary Owen, Steve Paris. *Oklahoma Innovations* is the show. Each week we try to bring you interesting guests from around the state who are involved in science and technology research and development. Also we talk to people who are in the commercialization side, we talk to people in education. Anything that's linked to science and technology in our state. We present them on this program and we can thank OCAST for bringing you this program. Our guest this week, a couple of interesting guys, Dr. James Long who is a veteran of the Levacor VAD, which basically is a Ventricular Assist Device, an electric heart assist device designed to pump blood to the body in patients with failing left ventricles. And his colleague, Dr. Trevor Snyder who is a research bio engineer at Integris, and these two guys work together hand in hand on this stuff, right?

>> Absolutely. And you heard from Trevor a bit ago, one of the very interesting and important things about this field is the need to cross disciplines. I'm a surgeon, he's a bio engineer, but we're both desperately needed if we're going to bring something as complex as this forward. This is probably the most sophisticated medical technology that's ever been produced. And the only way you can do it is bring together clinicians and bio engineers and scientists, along with patients who certainly have to have feed back on gives us directions on what it takes to produce quality of life. It's remarkable initiative that allows us to get into this realm of developing technology. And besides being someone who has really been interested in turning -- in pioneering the field of heart failure therapy from a clinical point of view, we've been very intrigued in the research side of this as well. The technologies are marvelous, but they still have some room to go. And you heard Dr. Snyder talking earlier about the need for miniaturization. But we also need durability. And one of the technologies we've been involved in developing is a next generation Ventricular Assist Device, referred to the Levacor. The standard we're using today is a device called the Heartmate, and that's already a second generation device that advanced beyond these large pulsing devices that we talked about earlier that were noisy and didn't last very long, only about a year-and-a-half. The Heartmate has advanced the field substantially, now making it a small device that fits in better, it's quieter, vibration-free. And

then we've got another generation of technologies where we'll have the ability to last as long as 10 or 15 years because we're able to do things like build rotors that float inside of magnetic fields. So there's absolutely no touching parts, only one moving part in this entire pump. And we expect no wear-out -- no wear-out of mechanical mechanisms at all. So the field has yet to fully explore the boundaries of the revolution that's ahead of us. We also recognize the need for miniaturization, and we'll get to these small technologies beyond this next generation that we're working on.

>> As nanotechnology evolves, I think we're going to see a lot more of that.

>> Very good. You know, Dr. Snyder mentioned earlier, as you noted, Jim, that the Heartmate was something that you worked on, he talked a little bit about the project. You just discussed some more of it. You have a story. This is about a year ago that this came to play. It involved a Cushing, Oklahoma lady, her name was Jessica Lavinge, she was 26 years old, the mother of two children. Tell us Jessica's story.

>> This is a -- not an uncommon story at all. You know, heart failure is no respecter of age. And it's not unusual at all that we'll find young people who have actually reached end of life, otherwise effectively well and healthy, robust, but heart failure ravages them of the opportunity to live and to live with a quality of life. Jessica, like many -- like most of our patients suffered progressive decline, debilitation to the point where she couldn't get out of bed, couldn't walk to the bathroom without being short of breath. That's not quality of life by any means, and finally reached actually a life-threatening stage where we were called upon to intervene, and were able to put a Ventricular Assist Device into her and give her a new lease on life. After a period of recovery she returned to a functional state, was out of the hospital for many months enjoying life once again, getting beyond those very severely restrictive limitations that she was facing, able to return to her home, and then because she was one of our patients who is still a candidate for heart transplantation was able recently to undergo heart transplantation and transition from the Ventricular Assist Device to a heart transplant. We have many patients who no longer are candidate for a heart transplant, and that's why we're so excited about this new era of being able to use these VADs for permanent long-term therapy. Jessica's one of the few that we were able to qualify for a heart transplant but we've got many others out there who are in desperate need. You know, we are talking about some very high-end therapies here, high technology stuff. One of the things that would be worth letting our audience know today that there are things that we can do to prevent you from getting to this state. Heart failure is one of the most serious cardiovascular disease processes we face today. It's tremendous in its impact on society. And one of the things that -- one of the reasons I'm in Oklahoma is because the need here is significant, frankly. It's higher than average across the country. And there are things that we as Oklahomans can do to make our lifestyles better, more healthy, watch our diets, watch our weight, all of that in the name of preventing progression into this very, very difficult disease of --

>> What is it about Oklahoma? I mean, have you come to any conclusions through your research and doing -- obviously having your history with patients.

>> Well, there are a number of risk factors.

>> It's almost a sociological issue.

>> It is. It is in many ways. It's not genetic alone. While there is some pre-disposition perhaps to diabetes, for example, among certain of our populations that may predispose to this. So much of

it is sociological. It doesn't take a rocket scientist to figure this out, when you walk through the fair and watch everything that you eat come to you on a stick, deep fried.

>> Yeah, but that's only once a year --

>> Yeah, all year long

>> Yeah, fried Twinkies --

>> Chicken fried steak.

>> Exactly. I mean -- you know, there are things we can do to improve ourselves. And certainly weight control is one of those, diet control. And look, while these high end therapies are incredibly important, I mean, let's face it, if we're all going to talk about revolutionizing medicine and controlling costs, wouldn't we be much better off dealing with prevention than applying all sorts of corrective measures after the fact.

>> It's cheaper and doesn't hurt as much, right?

>> Absolutely.

>> Absolutely. Well you have another example here. Last -- not last June 16, but June 16 a year ago, Victor Pollock of Oklahoma City, 73-year-old gentleman became the first person in the state of Oklahoma to receive a Heartmate II implant as a destination therapy. And here we're talking about the permanent use of the LVADs and tell us -- tell us Victor Pollock's story.

>> Victor's on the other end of the spectrum from Jessica. Victor was not a candidate for receiving a heart transplant. Primarily because of age. But still had a robust life outside of heart failure, which had devastated his life. And we were able to implant the VAD as permanent therapy for him and restore him to a very functional state. He's enjoying life and having a great time with his Ventricular Assist Device in this day and age. But he's also an important story that I may relay here just in the final moments of this. Victor came to us very, very, very late in the game. And if people get too sick they really can't even be resuscitated with these technologies. One of the problems we face is that we find people who just don't know these options are out there. We just -- we just find -- we find patients in communities who never heard of this kind of stuff. And if we can get the word out there that heart failure therapy and all of its -- in all of its manifestations, whether it be early stage prevention or all the way to very advanced care is available now in the state of Oklahoma. We think that's extremely important.

>> Is there a web site where people can learn more about your technology?

>> Yes, there is. The Integris health web site, there's an area for the Integris Advanced Cardiac Care Program. We're very honored that Integris is joined a lot of other great programs in this state to push the cutting edge on behalf of the people of Oklahoma. And this is presently the only program in the state that offers this. We're delighted to join an incredible medical technology and therapy in this state and do something that's cutting edge on the front tiers of science for Oklahoma.

>> Check it out, Integris' Advanced Cardiac Care Program, and you go to the Integris web site and learn more about VAD and all the wonderful things they're doing in their heart patient care. So we're delighted to have Dr. Jim Long and Dr. Trevor Snyder, the bio engineer, keep working on that stuff. It's guys like you that are going to make our lives a lot easier. And again, Steve?

>> I've had a lot more questions. We'll have to have them back on.

>> I'm sorry, we'll just have to bring them back because there's just too much to learn about. And the main thing is go to the doctor. Get your check ups regularly. Get your cholesterol down. Get your weight down. Get your blood pressure in check. Stay healthy. Exercise. We want to thank you very much for joining us on this week's *Oklahoma Innovations*, see you next week. Bye-bye.

[Music]

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