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Michael Holtz:

Stop.

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Speaker 3:

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Michael Holtz:

Welcome to Further Together, the ORAU Podcast. As ever, it is me, your host, Michael Holtz, from the Communications and Marketing Department at ORAU. And I'm not going to lie, we are talking about one of my favorite topics today. We're talking about research. I love research in all of its forms. I love understanding how it's funded. As I've mentioned to our guests, I have been a peer reviewer on research panels. I love breaking it down and helping other people understand what research does, where it comes from and how it benefits all of us. And that's a big part of what we're talking about today. So, I have two friends with me today from Emory University and we are going to talk about all things research and tech transfer. I have Kimberly Eck and Todd Scherer from Emory with me. And Kimberly and Todd, I'm so glad to have you here. I'm so excited we're having this conversation today.

Kimberly Eck:

Thank you so much for having us. We are delighted to be here.

Michael Holtz:

So, if you will, tell me a little bit about who you are. And Kim, we'll start with you.

Kimberly Eck:

Sure. So, I'm the senior associate vice president for research here at Emory University. I joined Emory about four and a half years ago. And I'm focused on increasing the resources available for research and other types of sponsored activity here at Emory.

Michael Holtz:

Excellent. And Todd, tell me who you are.

Todd Scherer:

Yeah, hi. Thanks, Michael. I am the executive director of the Office of Technology Transfer here at Emory, and I've been here for the last 22 years.

Michael Holtz:

Excellent. And it feels like there's no better time in the world to be talking about research than right now. So, Kim, if you will, give a little bit of an overview of Emory and some of your research strengths. And I know Emory is a longstanding, very well respected institution, so there's a lot of history there as well. So, tell me to the extent that you are comfortable and able, a little bit about all of that. I know that's like a giant question.

Kimberly Eck:

Oh, I have loved learning about the history of Emory since I joined. So, Emory College was founded in 1836 by the Methodist Church in Oxford, Georgia. It's about 38 miles east of Atlanta. So, originally was not located in Atlanta.

Michael Holtz:

Okay.

Kimberly Eck:

How it ended up getting to Atlanta is a really interesting story and it involves two brothers. So, in the 1850s, a family in rural Georgia had 11 children, and two of the brothers are in this mix. The oldest, Asa Griggs Candler. Does that name mean anything to you, Michael?

Michael Holtz:

It doesn't actually.

Kimberly Eck:

It's going to mean something in a minute.

Michael Holtz:

Okay.

Kimberly Eck:

But we'll get there. And then he was the oldest, he has a little brother, Warren Candler. He's the 10th of 11 children. Okay. So, Asa Griggs wants to go into medicine and has this opportunity to go to Emory University, passes it up so his baby brother can attend Emory instead. So, this is in the 1870s. Warren Candler attends Emory University. And 11 years after he graduates from Emory, ends up becoming the 10th president of Emory College. Now, are you feeling bad for the big brother? A little bit, right? Baby brother went on to become the president of the college. Don't worry, big brother went on to found the Coca-Cola company.

Michael Holtz:

Oh, okay.

Kimberly Eck:

So then fast-forward a little bit here. Warren Candler serves as the president for over a decade and ends up retiring, becoming a bishop in the Methodist Church. And at the same time in 1892, Asa Griggs founds the Coca-Cola company. Now, this is fast-forward, 1836. So, this is now 80 years later. We're into 1914. The Methodist Church has a falling out with Vanderbilt University and decides we really need a university in the south. And the Candler family has been involved in the Methodist Church. Emory was originally founded by the Methodist Church. And through a collaboration, a donation, a donation of land, a donation of money, suddenly Emory University in Atlanta is born. The first school to locate to Atlanta in 1914 was the School of Theology. And then other schools like our School of Medicine and Emory College eventually located to Atlanta, and it became Emory University over the course of five years. And Warren Candler came back to lead that reorganization.

And so, now it is headquartered in Atlanta. We're 30 miles away from where it was originally founded, but we do still have a campus out in Oxford, Georgia where our first and second year students matriculate. And it actually grants associate degrees. I bet you didn't know that.

Michael Holtz:

Oh, nice.

Kimberly Eck:

So, that's a little bit of history. Very early ties to the Coca-Cola company and really interesting transition to the heart of Atlanta. So, you also asked me about research and I want to talk to you a little bit about that. Early in Emory's history, Emory University knew they wanted to do something in research and they wanted to increase it. In 1939, a university research committee was established. And this committee of faculty members and leaders from the university was tasked with assess our research and scholarship, make some recommendations about how we can improve, how we can increase the visibility of our scholarship. And so, very early, we were very interested in research. 1946, Emory was a charter member of the organization that preceded ORAU and proud to be a part of that founding group of universities.

And in 1947 through some a number of conversations, Emory sold land next to its Atlanta campus, it's right across the street from me, literally right across the street, to the federal government, so that they could locate the Centers for Disease Control headquarters right across the street. Right across the street. And they knew there'd be collaborations. There certainly have been. So, our mission is to create, preserve, teach, and apply knowledge in service to humanity. And our faculty continue that mission today. It has been something that the faculty have been pursuing for now many decades.

And if I can, I'll highlight a couple of recent stories that have come out that I think are interesting that speak to some of the strengths of our institution. So, Emory last year did $1.2 billion in total research expenditures. Crossing that $1 billion mark was a big deal for us. We celebrate that, we're excited about that. And our largest of the portfolio is biomedical research. We do infectious disease, global health, brain health, artificial intelligence. And a part of being a comprehensive university and having all of these disciplines represented is we see a lot of really interesting collaborations.

Michael Holtz:

Sure.

Kimberly Eck:

And so, two of these crossover multidisciplinary collaborations. So, this one is really interesting. Have you ever heard of type 3 diabetes?

Michael Holtz:

I can honestly say that I don't think I have.

Kimberly Eck:

This is a new thing. This is a new thing that a collaboration from Emory, and it's even an international collaboration. But we have neuroscientists, diabetes experts, public health experts, they are trying to characterize, and understand and further define what this so-called type 3 diabetes is. And right now, we refer to this as a chronic insulin resistance and insulin deficiency state that's mostly confined to the brain. And the hypothesis is that this can lead to Alzheimer's disease and neurodegeneration. To understand that, you have to follow people for a really long period of time to try to figure out, well, is the Alzheimer's because they were going to develop Alzheimer's no matter what? Is the Alzheimer's related to this insulin resistance? Is it related to other factors? And to sort all that out, you have to follow people for years, and years and years.

Well, we have a 17-year cohort where we've been taking blood samples, we've been surveying these individuals, hundreds of people for over 17 years. And now we're going to start to look at and try to define this type 3 diabetes. So, that's a really cool project that crosses global health, brain health, public health, all rolled into one. So, I think that'll be really important as our population continues to age. That's one example. And then this is cool stuff. I love it.

Another example, I'll tell you one more story. One more. And so, this is in thinking about stroke patients. Many patients after they have a stroke have something about 60% will go on to develop some kind of post-stroke cognitive impairment. So, they have some kind of limitation. It can vary widely in its severity, but that might mean that an individual is no longer able to maintain a job, might mean they can't drive a car, they can't leave independently, it could end up resulting in dementia. There's a wide range of outcomes there. But it does affect a lot of really the majority of patients who suffer from a stroke.

And we know some risk that make post-stroke cognitive impairment more likely like age or having some kind of pre-existing neurodegeneration. But we're not very good at predicting an individual's outcome, like what is going to happen for this individual. And so, several of our researchers, experts who treat stroke patients, who are experts in nursing, who are experts in AI, are working together to develop some AI algorithms. And we're going to feed this AI system images of the brain, along with health information that we collect from patients. And we're training the AI algorithms to look at the blood vessels in the brain, along with these other known risk factors to try to hone in on why some individuals suffer more severe post-stroke cognitive impairment than others, and start to be able to predict that. And if we can get to a better prediction, that could really improve the way we provide care to stroke patients.

Michael Holtz:

Absolutely. That's amazing. Just [inaudible 00:13:08].

Kimberly Eck:

That's the overview of a few decades worth of work there in seven minutes. So, for those that have not heard of Emory before, maybe that's a little bit of history and some recent projects.

Michael Holtz:

That's amazing. Oh, my gosh. And all of these research discoveries I know are important on a number of levels. Just a minute of background on me. Actually, before my life at ORAU, I worked for the American Cancer Society, which also at one time was in the Emory CDC neighborhood in Atlanta. And you talked about the longitudinal study for the first example that you gave. And longitudinal studies are epically important for understanding how things happen over a lifetime. And there was a lot of discussion today about research, and how it's funded and how much is appropriate. And we're not going to get into all of that, because it's complicated.

Todd, as you and I sort of work kicking around before we got started, it's easy to talk about things in bumper stickers. Research is not one of those things because it's complicated to explain how it's funded, why it's funded, how things are decided that what gets funded, what the peer review process looks like. And then there's the whole economic engine side of why research is important because of something that we call technology transfer. And I know that Emory has been involved in some drug discovery work. And Todd, you're going to talk about the importance of that from the Office of Technology Transfer perspective. Tell me what is tech transfer and why does it matter?

Todd Scherer:

Yeah, I always love that question. There's a lot of different ways to answer that. But I think my favorite way is to say that what tech transfer is about and why we're here is to fulfill the university's commitment, because we are recipients of public funds to support research, so that when research has the potential to result in life-saving medical products and there can be other technologies that can benefit the public as well, to make sure that these results get developed into those products and services. So, technology transfer is a university's way to proactively address these opportunities. There's a lot of great things that come out of research. There are publications that advance the world's knowledge. We train tomorrow's workforce. But occasionally those research findings have commercial potential. That is where tech transfer begins.

Michael Holtz:

And there are some really great examples from Emory of what tech transfer looks like and things that have come to market because of tech transfer. Can you talk about some of those?

Todd Scherer:

Yeah. So, one of our greatest claims to fame is the discovery of a couple of HIV drugs. One is Lamivudine and the other is Emtricitabine. And they are licensed to different companies, and both of them find their way into a number of different combinations of HIV therapies. Because most HIV therapy is not just solo therapy anymore, it's a result of a number of drugs that can knock the virus down and keep it down. And these drugs have helped turn HIV from a death sentence into a chronic condition.

So, one of those drugs, Emtricitabine, is one in particular that I still see advertisements on saw all the time on TV. I mean, Biktarvy, you've seen that [inaudible 00:17:18] TV. If you look closely enough at that commercial when it comes on your TV, you'll see the Emtricitabine listed when the commercial first starts. The EM in Emtricitabine comes from Emory, derives [inaudible 00:17:32] from Emory. And those two drugs were discovered by collaboration of research much like Kim was just talking about between a chemistry professor and a professor in pediatrics. So, that's an example of where tech transfer can really help make sure that research delivers on its promise to change people's lives and benefit society because those drugs have been on the market for quite some time now.

Michael Holtz:

Right.

Todd Scherer:

Everybody loves big stories like that and technologies that save lots of lives. But as a matter of fact, most of the things we see in the tech transfer office don't have that kind of potential. But we take a lot of pride in those other kinds of technologies as well. And I'll give you an example because some of them never get the limelight.

Michael Holtz:

Okay.

Todd Scherer:

We had an invention disclosed to the office that described a portable telescoping mosquito collector for the purposes of monitoring disease spread in the developing world. And as it turns out, to Kim's point, who knew, there had been a long-standing backpack device that you carried on your back that was pretty heavy that had been developed at the CDC. And it had been the tool that had been used for decades to go out and collect mosquitoes. But you can imagine, it wasn't very portable and it didn't have some of the features of this new invention.

Basically what this invention did, this technology did is it took parts off the shelf from Home Depot. You can imagine some PVC pipe, you can imagine some screen, you can imagine a fan, and a blower and a cord, and you put these off-the-shelf components together and you build this telescoping tube that you can extend up under bridges. And you've got a little vacuum on the other end of it that draws a current down through the telescoping rod. And there's a screen appropriately sized so that as it sucks, mosquitoes down the tube, it collects them. [inaudible 00:19:44] mosquitoes can then be taken into the lab and monitored. That was sold in numerous countries throughout the world at cost. So, we never made any money off of that. The at cost, which is covering the cost of the supplies off of a Home Depot shelf. But you can imagine not everybody in every country of the world has access to a Home Depot.

Michael Holtz:

Right. That's not a big box store everywhere.

Todd Scherer:

And just to throw out one more exciting example. So, we all know that we're on the heels of a global pandemic And we know the challenges that created in a whole bunch of ways from a supply line perspective, or supply chain perspective, and also we just didn't have treatments for it. There were no vaccines, there were no drugs. And by the way, we probably could have had drugs and treatments decades earlier for COVID and coronaviruses, but there was no interest in anybody in paying for developing that kind of work beyond the kind of mechanistic work that the federal agencies and the federal government will fund. So, the pandemic hits and suddenly everybody cares about [inaudible 00:20:52] COVID-19.

And our researchers, for another example, we actually had one group of researchers that discovered a new use for a drug that had already been on the market and still is on the market. That drug is Baricitinib, it's known as Olumiant. And it's sold by Eli Lilly to treat rheumatoid arthritis. But what we discovered is that that category of drugs, JAK inhibitors we call them, could also be used in infectious disease, and more specifically for COVID-19. So, Lilly pivoted with that product and got a labeling and approval to use that to treat COVID-19.

The other drug that was discovered in this case, it wasn't just a new use, it was actually the drug and it is a new composition of matter, out of a special group at Emory that is tasked specifically to focus on drug development. They discovered a new molecule, and took that all the way to an IND within the university and then out-licensed that. And through a couple of steps of out-licensing, it ended up in the hands of Merck. The drug is known as Molnupiravir or Lagevrio. And that has been on the market for a number of years now throughout the world and is also available to treat COVID-19. So, we have many other examples of technologies and things that have hit the market, but I believe what it demonstrates is the ultimate validation of a tech transfer program, is for new products to end up on the market. And that's when we fulfill our commitment to the taxpayers of this country to make sure that we are taking advantage of their funding to make sure that it can benefit the country and the world in as many ways as possible.

Michael Holtz:

Amazing. I love all those stories. It's just incredible to hear how research is benefiting, and of course tech transfer then is benefiting, really mankind, generally speaking, because we don't all need mosquito collectors. But in some parts of the world that's a very important tool. I have no doubt. But the medications, the drugs to treat COVID critically important these last five-ish years. So, so much to celebrate and really honor about the work that Emory and other institutions have done. But since we're talking about Emory specifically, celebrating the work that Emory has done. And I understand that this is the 40th anniversary, the 40-year anniversary of the tech transfer office. That seems like a big deal.

Todd Scherer:

Yeah. And if don't mind, Michael, I would like to give you just a little bit of a history in the spirit of Kim's comments and going back to some of the historical things that led us to where we are today. So, if you go back to World War II, universities played a real key role in research that led to a lot of the technology that was used during that World War. And I won't go into the details.

Michael Holtz:

Okay.

Todd Scherer:

But shortly thereafter that a man named Vannevar Bush, wrote a timeless piece called Science, the Endless Frontier that established the creation of federal agencies and a federal system of funding research. It was recognized that if innovation coming out of universities could be that important during wartime efforts that wow, it could have just as much of an impact during peacetime.

So then from post World War II era, up until about the '70s, any IP that came out of that work funded by the federal government was owned by the federal government. It was part of the common heritage. It was deemed to be too important to let anybody else own it. But there was starting to be a recognition that there were just a bunch of patents file that were collecting on shelves and they weren't being developed. And the problem, and you can imagine this today, the problem was that those were owned by an agency perhaps in Maryland or South Coast, and your university could be anywhere in the country where the inventors were. So, the problem with that is it didn't align ownership with control or inventorship with local control.

So, in 1980 there was a public law called the Bayh-Dole Act that was enacted, that gave universities the ability to elect title to our inventions. So, now we could control them here locally where the inventors are because all of these inventions have one thing in common. They have more than one thing in common, but they have one critical thing in common, and that is a very early stage because they usually need more research. So, the ability to control ownership of those inventions here locally, where the inventors are and where the work continues, it turns out to be, was a monumental sea change in the way that we viewed intellectual property rights in federally funded research.

Now, along with that privilege comes a lot of responsibility. We have to comply with federal rules and regulations, and we have to report on those inventions so that the government can rightfully track them. We have to give a preference for small businesses. There's a US manufacturing requirement that we have to adhere to. But that's really what got tech transfer started. So, now in the mid to late '80s and into the '90s, you start seeing universities all over the country start to birth their first tech transfer offices. And Emory was no exception to that 40 years ago in 1985. They hired their first individual.

Prior to that, what little bit of tech transfer got done in the sponsored projects office alongside all of the other great work that was already being done focused on submitting grants. But in 1985, Emory said, "You know what? We think we need to take this more seriously. Let's hire a full-time individual." And so, Emory did that. Today we have 24 staff at the beginning of our profession, there was no expectation that staff would have tech transfer experience. If you had somebody from research administration experience that was considered a win. And if they happen to have a science background, then they were in.

Now we have registrations certifications, we have a division of labor. People specialize in Excel in areas like marketing, or startup formation, or licensing or compliance. And the other thing that has really changed now since the passage of the Bayh-Dole Act is this paradigm shift that universities no longer feel like it's somebody else's responsibility to develop our inventions.

Michael Holtz:

Okay.

Todd Scherer:

It's never a black and white kind of thing, but it used to be that much more of the work was very much focused on mechanistic type work. And if you got an invention in the tech transfer office about a new protein sequence that was thought to play a role in a cell signaling process that was thought to play a role in a disease process, well, we would file a patent on the protein sequence and we would begin marketing that technology. We'd lob it over the wall so to speak, and expect industry to come pick it up. And if they didn't, shame on them.

We've realized because somebody climbed up and looked over the wall one day, at least this is my theory, and we realized there was a giant desert out there, and the wall to get in the industry was way on the other side, and there was nobody there picking up these patents. So, what universities have done, and largely with the support of the federal government and an innovation ecosystem that's grown up around us, is fund and push our technologies much further along. We don't just stop with the discovery of that protein sequence anymore. We now do experiments that go beyond demonstrating even that it plays a role in that cell signaling process into whether or not it could actually become a new therapy. It's a very different landscape today compared to what it was 40 years ago when Emory hired its first tech transfer professional.

Michael Holtz:

And I know just from my experience in research and research advocacy that often, Todd, as you're talking about signaling and protein signaling, and often it isn't just Emory doing that work by themselves. There are collaborations there are what are called multi-center sites, and multiple research arms, and research happening in different parts of the country, even different parts of the world. But everyone's looking at this together.

So, just by way of a little bit of background, again, I'm a colorectal cancer survivor. And I was treated with a drug combination called FOLFOX that I learned was really experimental, was in trial phases in the late '90s, early 2000s, and was being tested at 18 sites around the world. And that happens a lot. I mean not just in cancer research, but in research generally. It's not just researchers at Emory. There's often great collaboration, great groups of researchers working on different aspects together. Or if this happens, then X. Or if this happens, then Y. And the folks are looking at X over here and the folks looking at Y are over here, but they're all looking at it through the same lens and through the same collaborative process.

Todd Scherer:

Yeah, it's interesting because one of the success stories or examples of success I didn't bring up is a drug called Obizur. And this is a drug to treat acquired hemophilia. And it took 22 years from the day that it was disclosed to my office. So, you go back even further than that [inaudible 00:31:15]. I didn't know when the research began, but it had to be at least 25 plus years until the time when a licensee finally got FDA approval and that drug was put on the market. 22 years. That's the longest example I have of product development, product approval at Emory. Now, there are many things that don't make it to the market, so I'm not including those. And there are many that are still in progress that may beat that record. And therapeutics take longer and require a lot more capital than most. But you can imagine how many hands touch that over the course of that 22 plus years.

Michael Holtz:

Right. It's not one guy in a lab doing research like the old cartoons of the scientists shouting eureka, and he's figured it out. It's groups of people collaborating together with different scientific focuses. You've got the microbiologists working with the chemists, working with... et cetera, et cetera. And again, I think that where we started is science is complicated, research is complicated, but great things happen because of the work that's happening. Kim, where we started was how proud Emory is and this amazing history. And Todd has shared some more of that. I mean there's amazing stuff happening at Emory for sure.

Kimberly Eck:

And Todd didn't brag, but I'm going to prompt him to brag now. He's being humble because recently, there was an independent scholarly analysis of where therapeutics come from. So, Todd, do you want to share that headline?

Todd Scherer:

Yeah, sure. In the Journal of Technology Transfer Research in 2023, there was a study that looked at where drugs come from. And it turns out that Emory is number three in the world behind the NIH and the University of California system-

Michael Holtz:

Stop.

Todd Scherer:

... at discovering new drugs that have hit the market and benefited people. So, number three in the world.

Michael Holtz:

That's amazing. Amazing. I love it. To be number three in the world. And you're three hours away. I need to come visit. I need to.

Kimberly Eck:

Come visit anytime. We'll do the tour. We'll do the full tour.

Michael Holtz:

I love it. Again, it harkens back to the amazing storied history of Emory, but just how important the research element of Emory is, and again, why research is so important and why it's not... and Todd, as you said, it's not a bunch of people in Bethesda and DC. The patents might live there, but the work is actually being done in community, in Atlanta, in other places where research universities are thriving, doing incredible work that is benefiting humanity at the end of the day. By way of wrap up, is there anything that y'all would like to add that I haven't asked you?

Todd Scherer:

I don't think so. There are many other ways the conversation could [inaudible 00:34:53].

Michael Holtz:

We can talk about a lot of things, I'm sure.

Todd Scherer:

[inaudible 00:34:57] innovation ecosystems or those kinds of things, but that's probably all fodder for another day.

Michael Holtz:

Awesome. Well, last question for you in both then. It's my favorite question to ask anyone is what brings you joy? So, Todd, I'll start with you. Todd, what brings you joy?

Todd Scherer:

What brings me joy is seeing Emory technology on the market and taking great pride. I think I have been involved in the technology transfer of eight or nine different FDA-approved drugs. And I take great pride in that work.

Michael Holtz:

Awesome. And Todd, how long have you been with Emory?

Todd Scherer:

I've been here 22 years. I've been in the academic tech transfer business for 34, but I've spent 22 of those here at Emory.

Michael Holtz:

That seems like an amazing track record, to be third in the world with nine FDA approved drugs under your belt. So, I dig it. And Kimberly, how about for you? What brings you joy?

Kimberly Eck:

Yeah, I love to be able to support research both in an institutional way and then even in small tiny ways. So, just this weekend we have a department of psychology here and some of the researchers focus on childhood development and understanding how children think and when different concepts emerge. And I have a six-year-old daughter who I signed up to be in the experiment with her permission. She was very excited about it because she knows mom does something with research. And so, she thought it would be really cool to come to Emory campus and participate in this research study and she did a great job. She's welcome back.

Kimberly Eck:

As you don't know that kindergartners are like, "Well, I don't know how this is going to go." But I'll tell you just a smidgen about what they were looking at. They were looking at this concept of rule enforcement as a pro-social behavior, as a part of how we behave in society.

Michael Holtz:

Okay.

Kimberly Eck:

And so, I could hear through the door. She's in with two researchers. One is an undergrad student who's participating in research as a part of her undergraduate experience here at Emory, and another is a staff researcher. And one researcher was manning a puppet, and then my daughter was in the room. And so, the puppet and my daughter were asked to pick up some game pieces, help clean up this game that we were playing. And if you do that, you'll get a small prize. And so, the one researcher leaves the room and the puppet says, "I'm not cleaning up," but my daughter is cleaning up. She's obeying because she wants the prize, not because she wants help. She definitely wants that prize. And so, the researcher come back and has two prizes, one for the puppet and one for my daughter. And so, she goes to hand them and my daughter rats out the puppet immediately. "She didn't help clean up. The puppet didn't help clean up." So, that pro-social behavior is well-instilled in kindergartners based on my observation of one.

Michael Holtz:

I love it. Research and action, folks, right there. All right, well thank you so much to both of you for this opportunity. I really have enjoyed our conversation. And I hope we can talk about another element of research another day. Again, research is complicated. Talking about science is a complicated matter. We've brushed the surface, so to speak, but I would love to have this conversation again if at some point you both are game for it.

Kimberly Eck:

Absolutely. Thank you so much for having us.

Michael Holtz:

Absolutely. Thank you so much for being here.

Todd Scherer:

Thanks, Michael.

Speaker 3:

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