Introduction and Speaker Background

Welcome again, everybody, to the Sleep Deep Summit. I'm your host, Dr. Audrey Wells. And our next speaker is a highly accomplished physician. And I'm going to read you some pieces of his biography.

But I want to tell you, there's so much more than I'm ready to. I'm getting ready to say his name is Dr. Azizi Seixas. He is the interim chair of the Department of Informatics and Health Data Science, Director of The Media and Innovation Lab (The MIL) as you're going to see in his background.

He's the Associate Director of the Center for Translational Sleep and Circadian Sciences and he's leading the University of Miami's Digital Therapeutics Vertical in the Institute of Data Science and Computing.

Fantastic to have you here, Dr. Seixas. Welcome. Thanks for having me, Dr. Wells And I'm just very delighted to be here. That's great because you have expertize in an area that is super hot.

And so I'm so happy to bring this information to people who are interested in how sleep and technology interface. Now, my first question to you is about wearables.

This is a moving target. Technology has really advanced. And I know that one thing I get asked all the time is how do I pick a wearable device, a sleep tracker for me?

How would you advise someone? Well, thanks so much, Dr. Wells, this is amazing to be here. So we know that technologies are very vast and wide. Particularly sleep technologies.

And it really depends on, you know, several different criteria in terms of what to choose. I often times since we're talking to live, folks, you got to have to consider price point.

Choosing the Right Sleep Wearable

Price point is an important component. And the reason why is because typically that the more expensive the device, the more, you know, accuracy, the better the sensors, the more set of features or more features that you will have that can potentially drive action and insight.

So you want to be aware of what the price points are. So I won't tell people how to spend their pocketbooks or anything like that. But once you've established what the best price point is for you when it comes to different sleep technologies, you know, we know that there are several different classes of technologies.

We have wearables and we have measurables. Wearables are those types of technologies that you wear on your body. So it might be a watch, it might be a ring, it might be a headband, it may be a patch that you are actually wearing on your body, or it might be a combination of all of the above.

And so another that second criteria really has to be what fits your comfort level. Some people may not like to wear watches or they might feel bothered wearing something on their wrists when they're falling asleep because it might significantly impact their ability to fall asleep and stay asleep.

And so this is why some folks have opted to wear something that has less of a footprint, like a ring. And so that's kind of where I would really focus on.

So the first thing would be cost. The second thing would be more about what your comfort level is. Now then the third would be about which one will provide a more accurate or more reliable depiction of your sleep performance or sleep behavior.

Sleep quality, sleep duration, whatever you want to call it. What we know is that not all of these devices are created equally, and it depends on the different type of sensors that are provided.

No, I'm not expecting people to go ahead and detect. Detect which sensor is being used are not what you may want to do. A little bit of homework trying to think about which types of sensors work.

So that's one area. The one thing that we have done in our group and people should be aware of this is that when you're using watches or rings, that if you lift it up, you might see a red light or a green light.

That's pretty much what that is doing, is that that is essentially sending some message through your skin and it's getting a message back to be able to detect movement activity.

It might detect other different types of physical types of outcomes like oxygen levels and the like. What we do know is that the way in which those sensors are created, they are not created equally for all.

So what we have found is that people with a darker skin pigmentation, generally, the way in which those sensors are built, the way in which those Algore dims, which are basically the engine, the analytical engine that runs that hardware, that they don't do a reliable job detecting accurate certain sleep and health outcomes for people of darker skin pigmentation.

And so this is why you may need to move away from certain different types are glasses off of wearables that uses those kind of photon generated type of technology.

And instead, you may want to use a more medical grade type of device. And there are some headbands that do a better job using different technology that can measure sleep differently.

So not to go on my soliloquy, but what I just shared was price point, which is a critical component. Secondly is what their comfort level is. And third is whether or not if this particular device can be trusted or not.

The last and fourth is really looking at the level of engagement, what kinds of behavioral knowledge, information, gamification, that particular software or app can provide.

I think those are the four criteria that I would recommend that people think seriously about. I'm sure there are others. You know, there's a lot of good information there.

And I love that you listed out the criteria because it helps to really crystallize what people can use as they're shopping for this type of consumer device.

And I want to just take a minute to underscore something that I totally agree with you about, which is that there's sort of a consumer grade wearable, and then there's a medical grade device that's going to pick up a better signal or a more frequent signal or more reliable signal in medical situations.

And, you know, that's something that I feel gets a little bit blurry when we're talking about marketing efforts for these types of devices. And I just want to be really clear that at this time, the consumer devices have not quite caught up to a medical grade device.

That is correct. No, don't get me wrong, because I don't want any. And it should be noted, I do a lot of work with everyone and some of these are consumer grade type of devices.

We are not saying that they are, but I think they have value. Right. For example, I would prefer someone use a device that will keep them in gaged in tracking what how their sleep health habits are or just general health habits.

I'd rather them get some level of feedback so that it can provide some level of positive reinforcement that they need to change behaviors so that they can lead healthier lifestyles and also, I think a lot of these consumer grade devices, we have to we have to contextualize their maturity as well.

I think we're into the third inning. I'm not a baseball guy, but I'm just assuming that that they're about a third into where they can go in really fully being an end all solution for consumers.

And I think what that means is that they're not going to get the technology correct all the time, I think. And I'm not making excuses for them per se.

Consumer vs Medical-Grade Devices

But a lot of the sensors on the technology and the hardware, the mineral or that are utilized to build these, that in order for them to make a profit, that it's pretty you know, I wouldn't say pretty, but it's more economical and more affordable.

So what we do know is that when you go cheaper on the technology, no matter how brilliant the algorithm is, it's just not going to be able to detect things well.

And so that's where I want to contextualize that. These devices are just in their third in India. They have a ways to go. I think I've spoken to some very reasonable CEOs and tech folks, and they want this level of feedback.

This is why they're engaged in a scientific and a clinical community to get feedback as to how they can be better in serving the communities. I agree with you know what you're saying.

You know, it's really nice to hear that the people who are driving these decisions to move forward with technology are interested in how they're consumed.

And I also agree that, you know, the wearable devices that track sleep have increased our awareness of how we're sleeping. And that allows for some better decisions, some behavioral change and kind of elevating sleep into conversations about health as we're now able to get feedback about how staying up late, having unmanaged stress or even having a glass of wine we're here can affect our sleep.

And, you know, something that I really like and I think is being explored more is the the fact that a sleep tracker is tracking the same person every night, multiple nights of data, and after a while you can kind of get a feeling of your sleep personality.

I think that home sleep testing from a medical standpoint is moving in this direction, too. And I think that's that makes a lot of sense. It does. And it needs to. Why?

Because I'm I think anyone who is listening may not agree with this, because I think they they already are believers that they understand the value of sleep.

And if they are not, I would say welcome to Dr. Will's program and she's doing an awesome job and stay plugged in. But but I think what you rightfully pointed to is the idea that it is important to keep people engaged to understand the value of sleep, particularly those individuals who may want to understand how sleep impacts their everyday lives and how small, slight adjustments can have long term impact.

I'll also say another area that I think the research has borne this out and I think it doesn't get a lot of attention, is that while the focus is on sleep, on improving sleep, the beauty of many of these technologies is that they are sleep, wake activity trackers.

You're not just sleep. And so one is you have to be able to understand that they might be good at measuring sleep, but not good at measuring activity or vice versa.

Good at measuring activity, but not good at sleep. Well, what as you eloquently described, is that it can pull together a 360 degree time series, longitudinal picture of what is happening with us over time.

So we've been some studies that have shown actually where even though sleep was the focus, I think there are so

many physical or health artifacts that occur during sleep that is important.

Sleep Data, Health Insights, and New Sensors

Studies showed that when they looked at someone's sleep heart rate variability, that it actually was a greater predictor of some imminent heart health condition.

So while the importance of these technologies may not be helpful in capturing sleep reliably and accurately, but what it did provide was an opportunity to measure some very critical and important health outcomes that occurred during our sleep because remember unconscious that you can't see, you can't feel these effects, but it can actually pick up on signify frequent changes in your physical being and your physiology while sleeping, and then be able to correlate that with hypertension, glucose levels, heart health, all of these different, you know, I'm saying so I think that the opportunity is available.

Yeah, I think there's some really exciting things on the horizon. I recently saw an article saying that Apple is coming out with some additions to their smartwatch to measure glucose and blood pressure.

And like I feel a little bit conflicted or like I have a split. On the one hand, I'm like, Yes, that would be so great for prevention medicine to really give people some insight into how these things fluctuate.

And then the other part of me is like, Yeah, but is it so reassure? Is it over reassuring? It is. Somebody's going to have the same characteristics as the test population that this technology was developed with.

You know, I think there's kind of a few ways this could go. Do you have the same conflict when you hear about these things on the horizon? I do. But but I'm I'm a technologist at heart.

So, so, so so I am more the early adopter than done. And some of us who as opposed to others, it should be noted, though, and just want to be I'm only acknowledging I'm paying credit to some amazing scientists who actually pre-date dated Apple's decision to measure glucose through the watch.

You know, so I know a colleague at Kennesaw State University who was doing this work who created an algorithm to detect that, and I know others have been doing so.

I think what Apple has done, which I think it's a good tactic, is, let's see where the science has gone. And I think the reason why they're incorporating is that because there is mounting evidence now where you can actually detect that.

And it's basically looking at institutional type of glucose levels. And I think that is an important thing. So it can be done. Can it be done reliably?

We're not sure as yet. But I think the beauty and the power of Apple is that they're going to be able to build this within a suite of solutions. So I just want to acknowledge that the reason why I acknowledge that is because because this science has a long history of development, then my hesitation or reticence is not as heightened because it does have a strong body of work that is that has supported it.

I don't think it's where while Apple came up with this fantastic, great idea and then they're just going to try to, you know, treat all Apple users or Apple Watch users as guinea pigs know.

This is robust science. Yes, they need to fine tune the engineering of it, but it could potentially, you know, find important draws. Here is why. What we're learning in metabolic health right now is that typically we always saw metabolic health as this binary construct, whether you have elevated glucose levels or not or you have insulin resistance or not.

And so what we found, especially in in trying to do population health, is that people live within these margins. Right. So you have elevated prevalence of pre pre hypertension and pre-diabetes.

And so how is it that we can provide a better way in which we can do early awareness, early detection, early treatment? And so without putting significant burden on our health care system, this is where digital technology solutions can serve as a means by which we can increase awareness, increase management, and increase treatment early on as opposed to later.

And so for me, not only am I excited, but I see the significant population health value. And this is why we're doing this, this this type of work, because now is now is where we can fully understand not just the binary nature of glucose levels or elevated blood pressure, but what we do know is that the variability, the significant spikes in glucose level or what we call glycemic variability or glycemic excursions, that seems to be causing more significant damage to the pancreas because the pancreas is very critical in producing insulin through those beta cells.

And I think that's where we can do a little bit more, a little bit earlier vis a vis these technologies. You know, you're seeing in my song and I want to say that I'm very happy to geek out with anybody who wants to highlight circadian rhythm as necessary for long term health.

So you're right. Like these measurements are taken over the course of a 24 hour period. That's a circadian time period, and then kind of overlay on different things that we can use as a predictor of health or to manage conditions in order to point your vector toward a healthier outcome or longevity.

You know, these things are very powerful. And I want to pivot a little bit because what you're discussing is just generating so much data day to day to day to data.

AI, Digital Twins, and Personalized Care

And so we need to manage that data and distill it and make it consumable for people like me, doctors who need to look at all of these different wearables and kind of orient myself to their outputs.

Can you tell me what's being done to make that easier? Yes. No, no. I'm going to geek out. There is a lot. I think there is a lot. So so I'll talk about this from a consumer basis and then from a professional technical basis.

So from a consumer basis, what this means and this is something that we're working on right now might seem a little scary, but I think this is where medicine and health care is going.

But I'm going to describe the technology, but I'm going to describe the value of the technology. So what we're currently doing through several of our studies is that when we collect vast amounts of data on that individual, we are now able to harness Kool-Aid to read, harmonize those data in a way where we can start to better understand unique signatures of that individual, where we're going to be creating digital biometric twins of each person, and overlay that with biological components as well.

The reason why that is, is important and let me talk about the value. As I said, the just spoke about what it is and what can begin. And when you talk about the value of creating this really deeply, being a tight version of yourself, what we do know often times that when we go to a health care provider and we ask questions or we do certain tests and they can't figure out what works, when you ask questions and you probe, does this work?

Does it work for me? I don't like it should work because. Why? Because it works against the average. But we know that health care should never be practiced in a one size fits all approach.

A warehouse method, an approach to health care has oftentimes helped but has done some damage as well. Right. And I think this is where, you know, you want to you know, in a conference that I had the other day, we had Ze'ev Nurse who wrote Beyond the Walls, and he was talking about one in more.

You know, you know, mistakes are made in health care each day. And it's partly because it follows this one size fits all approach where you miss the nuance and the detail.

So no, we can provide a very precise and personalized method and approach to treatment on health care. Wouldn't

we like that instead of asking the provider and the physician and having them guess what might work, I want to have that level of confidence that they have studied me, they have studied my behavior, they have studied my DNA, my genotype, and they can tell me precisely what medication will work, what the timing, what the dosage is, under what circumstances and context will optimize the benefit of that treatment.

So so that's one area. So so that's from a consumer standpoint. Let's go to from a kind of a provider technology standpoint, how does this vast amount of data help some talented, brilliant physician like Dr.

Wells? Exactly right. And she didn't pay me to say that, by the way. But but but I think what that allows providers to do is that providers have countless amount of patients that they have to see back to back to back to back.

It's like a supply chain, many people will say. And I've had loved ones say, I just want to talk to the physician, I just want to talk to the physician.

And instead, no disrespect, they talk to other folks who are proxies, and that particular person may not have the years of experience to be able to address the unique question that people may have.

So here's what we can do with AI. We can, ahead of time, gather all of those data, build models, recommendation models, use in generative AI to better understand what have been unique uses are.

Do you fit a particular profile of patient? Well then if you should a particular type of patient then know you're giving the provider a lot more context.

You're doing a lot of the menial heavy lift that the provider will have to do, so that when the provider sees you, they are all prepared. Not saying they're not prepared, but they're even more prepared, more equipped to then offer innovative solutions that are bespoke to that particular individual.

And from a technology standpoint, what these data allow us to do, particularly the vast amounts of data, what they allow us to do, is that know we can actually better understand causes of disease, because before our understanding of certain health conditions, we're limited by the limited amount of data that we have.

So know that you have more data, you know you're going to be able to understand not just the onset, but the life course, the trajectory, not just of how it was engendered, but how it's been managed.

And then you can potentially simulate what treatments work for whom when you have all of these different types of data. So what I just laid out was a value to consumer value.

Talking about twin digital twins and precision medicine shared what the value is for providers, how it can increase productivity and efficiency so that it can provide care.

And then I spoke about the technology. What does that mean? Because we believe that will be the next way in which electronic medical records are going to be, because when you go to your provider there, get an intermittent interval based types of data, a lot gets missed.

We want to be able to fill those gaps and with these volumes of data, we'll be able to paint a more cohesive picture of the patient. So much, so much in that wonderful answer.

That's amazing. And I feel excited just with the possibility that there are these things on the on the horizon. Because what you're talking about is not just precision medicine taken to a whole new level.

You know, there are different types of insomnia, for example, there are different types of sleep apnea. I am quite sure that on the street nobody would look at me and say she's got sleep apnea.

But the fact is, I am capturing the beginning of my own sleep apnea right now. And I know there's many other women in my position who don't look like they have that condition.

But caught early, yeah, something can be done. So I love the idea of these different phenotypes. Avatars. The digital twin is great. When you said that, I kind of pictured a situation where I might sort of predict how different behaviors would go for the good.

Oh, that's what we do. Yeah, yeah. I mean, the idea of the digital twin, not to quote to you, tell me. Yeah. It has, it has been successfully used in engineering.

So a lot of my background uses technology and engineering. And so when you're trying to fix, let's say, you know, I fly a lot. And how is it that airlines know when a particular engine needs to be fixed that create a digital twin for each engine?

And could be, yes, they are able to determine when that particular engine needs to be fixed. No, it's not in isolation because all the data from the control towers off that airplane is feed into that data.

So it's not a static twin. It's a dynamic twin where as more information is provided.

Privacy, Ethics, and Data Ownership

So all we have done and others are thinking about this as well is to transpose and to learn how other industries have been doing this. And that's part of one of the areas, one of the innovation series that I suppose the idea of arbitrage, where you have one particular framework or tool that is used in one discipline or one industry, and people may not think much of it, but if you transpose it to another discipline in another era, then the value of that has significantly increased.

So we call that the arbitrage theory of innovation. And so that's kind of what we're doing here. It's incredible. You know, I think that a question that comes up for many people when they consider these advances in technology, A. I.

and big data management is, okay, you know, where does it end? Is this is there any danger of privacy concerns? What sort of things can you say about management of that data, keeping people's information separate and private and respected?

Yeah. So, wow. I mean, I don't mean I don't want to give another full throated response because I have to say. But but I think I think so. Here's my approach.

And I know it's the approach of technologists or companies, and I can't speak for all of them, but I've spoken to some very influential folks and I know they believe this, that privacy and ethics and confidentiality and trust are the greatest hallmarks and greatest values in which you can build any technology business.

I think yes. I think, you know, pre-dating, you know, President Biden's executive order on AI, which happened a week or so ago, that it was almost the wild, wild west where people did not have guidelines on rules and policies as to how people could develop technologies, their own A. I.

and curate data and how they can be utilized. And how do you communicate that to the public? I think what we are seeing now is a new dawn in which that there are rules and and so there are going to be new rules.

And the new rules are going to be bad, some of them, and we just have to evolve them. So that's I'll just kind of set it as a preface. Yes, there are some technology concerns and privacy concerns, but I think it's no different from, you know, other things that we just, you know, willy nilly give over our data.

So we all sign up on social media and we don't think where those data are going. Recognizing, though, that health data are not more private. So I'm not trying to minimize that, but I think we can do so responsibly, meaning we can create data, but at the same time, be honest with the public and by that I mean the global community and public as to what the value is and then put some safeguards around that now and not to be an Andrew Wang guy, but I know when he was running for president he was talking about ownership of data and it's not an idea that he created, but

it's something that many of us believe.

How is it that we can democratize data, democratize data in a way where Dr. Wells owns her data as it owns his data, and only we can give provisions on permissions to people how to use those data.

And if people use your data for intellectual property development or anything like that, then we should get some kickbacks, right? That we should get something.

And I think that that will come at some point in time. And I think that's where I think, you know, people want to make sure that we have some rules around that.

But can I dare say that the idea of misuse of data predated technology that many of us know about? The story of Henrietta Lacks, who was an African American woman whose DNA was utilized to create many different therapies for cancer and all this, all different types of irony, DNA types of therapies.

And so what I would say is that the ethics are wrong. The misuse of data actually is a super ordinate theme. It's not just specific to technology. And I think we need answered those types of questions as to how involved we should be, who should own those data, and how do we provide provisions that those data can be utilized.

You know, what you're demonstrating is your expertize and your deep knowledge in this space and technology moves so quickly that, you know, in some sense you are kind of at the vanguard of how we try.

To we try. And and I love it that you're able to translate that for people who aren't as connected into this line of thinking. I do want to say that I have worked with HeLa cells that H is for Henrietta, La is for last and that was something that, you know, I knew from the start.

Ambient Technology and Future Sleep Monitoring

I was very thankful to my my pi in the lab for sharing that we have gone from wearable technology to a digital twin and beyond. And I really think this is a fantastic ride.

I really appreciate being exposed to all your knowledge, and I thank you for just letting us all understand what's in the pipeline, what's in the future.

It's very exciting. Well, thank you so much, Dr. Wells. And and as you know, right now, there are new technologies that are being created, particularly Marable's I spoke about wearables.

The Marable's are those things that can capture things from afar. And what I've said before, as you can see and it's an interesting thing not to be too prophetic or philosophical, that human beings with the advancement of technology, it's almost as if the human being is becoming more ambient and the technologies are becoming more human.

And so this idea of ambient technology, Marable's things that you won't even be able to detect. We can get valuable information from our light bulbs in impact in our sleep.

We can cross-reference that with our wearable data. We can cross-reference that with our phone. We can cross reference that with our television or phones.

That's what I'm excited about. But as I said, it needs to be done responsibly. And so I'm just very honored and proud to be invited by you to share with the community where things are.

We want you all to follow us on this journey, and so I thank you for the opportunity. Dr. Wells. Thank you so much. You know, I hope in my lifetime I'll be able to have a Jarvis from The Avengers.

I don't know if you're a fan of Marvel, but Jarvis to me is like the just, Oh, that would be a fantastic assistant. Of

course it's coming. It is coming. And better as well.

I love it. Yes. Thank you so much. Thanks again for the opportunity. Thank so much. You're welcome.

Contact Information and Closing

And I want to end by asking you if people want to learn more about you and what you do, how would they go about that? Well, I think they can reach out to me.

azizi.seixas@med.miami.edu So azizi.seixas@med.miami.edu or I'm on most social media platforms from X to LinkedIn and and so I'm more than happy to reach out to anyone.

Please reach out to me. My X is @SeixasDr At linked in It's Dr. Azizi Seixas, And so I'm more than happy to chat. I'm not on TikTok, but I'm happy. Yes, yes, yes, absolutely.

Thanks so much for having me. Very good to connect with you today. Thank you so much. Thanks. Keep up the great work. Dr. Wells. Thank you.