AI and the Quest for Olympic Gold

Jemele Hill:	Good afternoon everybody. Thanks for joining us. Um, we're here to have a discussion about the impact of data and artificial intelligence and a lot of other really cool things that I am not smart enough to explain, but luckily my two panelists here are smart enough to explain these things. Um, so let's get right into it. First I'd like to introduce Lindsay Thornton, who is the US Olympic and Paralympic Committee, a sport, a psychotherapist, and does that psychophysiology of seat. Thank you. Cycle physiologists. See this is what happens when you put the least scientific person on the vandals. Um, so Lizzy is here to offer her expertise obviously in this area. And then we have field Cheatham. Who is the u s o c p is it now? Uso Pc. Oh Geez. OPC, OPC USA Olympic and Paralympic Committee, Olympic and Paralympic Committee. He's the director of sports technology. Um, and uh, we want to get started first a cause. Phil, we have a video. Yes. And which you can tell us a little bit of more about, uh, what people are about to see in about some of the exciting data possibilities that many of us will see unfold at the Olympics that have been unfolding. So why don't you go ahead and cue that up for us.
Phil Cheetham:	One of the technologies we're going to talk about in our session today, and I thought it'd be nice just to give you an uh, a video to give you an idea of what it's all about. We're using rain radar technology to measure the launch characteristics of shotput and help our athletes improve performance with knowledge from the results. So here we go
Speaker 3:	with the shot, put the distance is very important. That's the key thing that's measured in a competition. The radar technology measures the launch characteristics and they include a cost of distance or to throw, which is the most important factor, the things that go into that distance, include the velocity, release, the angle it release, the direction of release and the height of relief to be able to now wait three seconds, five seconds after throw and then know exactly all of those variables and with five seconds later to watch the video of it. Just like that.
Speaker 4:	Being able to see right there on the spot and then knowing what I felt and what I think I did, but to see it then to see the numbers with it, it makes a difference. I can kind of make those small changes in my mind mentally and I think it really helps me connect them.
Speaker 3:	The biggest thing with the data is we keep it in the cloud and by keeping it in the cloud, we're able to access that from all over the world at any time of the day. Whether I was in Beijing at the 2015 world championships and one looking back at a practice I had here, I'm always able to go back and be accountable for that dude and our coach and I can assess to where we need go with the next practice. The technology consists of a radar unit and it sits about seven or eight feet behind the ring. Looking at the athlete, looking at where the shot put is

going. My favorite thing about using this data as I see my best throw of the day, I got to my worst though that having the data changes the coach and athlete, um, interaction simply by being more precise.

Speaker 3: In the past it was qualitative type suggestions like, oh, I think that was too flat for, Oh, I think that was too steep or that was too slow. Now we know that flat means 30 degrees, 32 degrees. The ideal is about 36 to 38 degrees of launch angle. But when you're looking for such small changes, when you get those additional variables of velocity especially so you can kind of see how much power is actually there, you can, it gives you just one more element to look for and that really helps you differentiate what made this throw better than the last one. You've got that data now that allows you to optimize exactly the type of feedback that the coach is going to give an athlete right there in the circle. And to be able for the athlete to make those neural connections, if you will, based on that feedback immediately after that kinesthetic feedback that they're already getting from their movement. You know, it's, it's really

Speaker 4: for me to continue training and to defend my title, I'd definitely need that confidence support and more access to the technology. I'm getting older. So the more feedback that I get to work on the smaller things, we'll definitely make a big difference. At this point in my career,

Speaker 3: Korea, we've got a Groupon for hours right now, um, both Americans and international that are kind of approaching the world record. I think as we get closer and look you're breaking that it's definitely coming. It's gonna come down to training smarter and using everything we have at our disposal to our advantage. Uh, kind of hopefully go where, where no man's gone before three medals. He's great and we're not trying to be greedy, but we have the talent in this country where we can achieve more, not only to get more, but to protect those metals that we did get. Cause he asked in the world they're not gonna, they're not gonna slow down. They're not going to stop. We've got to stay ahead of

Jemele Hill: right. That was a good kind of base modeling of, of what people can expect in terms of how the data is used, how athletes are embracing it. I'm fulfilled. I want you to give us some idea, especially with all the predictions being that when the Olympics are in Tokyo for 2020, that we will see data collection, uh, with the combination of artificial intelligent used in a frequency in a way that we have not seen before in previous Olympics. Can you give us some idea of what the evolution has been in terms of data collection and artificial intelligence?

Phil Cheetham: Yeah. Well you saw in that video that were out there at the training center, and by the way, the three athletes that you saw in that particular video, um, in Rio went gold and silver and gold and Michelle took gold in the women's and Ryan took gold. The men's and Joe took silver. So we'd been using that particular technology at the training center for about four years. But one of the things that, um, is difficult is what do you do with the data when you've got it? We

AI and the Quest for Olympic Gold (Completed 06/27/19)
Transcript by Rev.com
Page 2 of 16

uploaded to Google drive and so they have to then go and have an account on Google drive. They have to download it. It's way easier than it used to be with the USB stick or a DVD or a CD or that sort of thing. But it's still not where we want it to be. What we like to have, and we're developing right now as an athlete monitoring system, and what that means is that data will be fed up to the cloud.

Phil Cheetham: The, uh, parameters and the values will be immediately calculated, put into tables and into text and displayed to the athlete. They can go into their locker if you like and find out their throws from, from today. The next step as far as AI is concerned, is to start sifting through all that mammoth amount of data that the big data, if you like, that we've had from the past four years that we're continually gathering to show what the trends are, to show what the key performance indicators are for performance and the key indicators for injury. Um, so that we can mitigate injury and we can improve performance. So I like to think of it as kind of a continuum from capturing the data on the field, feeding it up to the cloud, doing all the analysis and the AI and then feeding it back down to the coach and the athletes so they can implement what we've shown them and what they've learned. And that's the biggest thing. If we don't, if we leave it up there, if we don't implement it, then we've wasted our time. So we have to communicate with the athlete. And the coach on how to make changes from what we've found. And that comes down now to simple drills, simple exercises and movement changes. Um, and that's key to making the improvements.

Jemele Hill: No, Lindsay, I'm a, with your relationship with athletes, have you been able to use, um, maybe I'm not particularly radar technology, but how have you been able to use this technology and the intelligence you're able to see through data and how you guide and direct athletes?

Lindsay T: Sure. Um, well, so one of the major ways would be through sleep monitoring. So we monitor nighttime sleep and daytime naps, um, to inform our understanding of an athlete's recovery process. So your nighttime sleep is your number one recovery opportunity. Athletes obviously supplement with daytime naps because they're often up early for training and the traveling internationally quite a bit. Um, so right now we're using, um, and intervene interval conversion, which is sort of a way to measure the heart rate in time and yeah, using that data to understand sleep and sleep parameters and what's happening in the nervous system. And so the central nervous system and the autonomic nervous system during nighttime sleep. Um, and we're also collecting a lot of other variables. Like which time zone are you in the world? How long have you been there? What are your, um, training efforts and your rate of perceived recovery?

Lindsay T: What do you have coming up? I'll all of these, some s some are subjective summer objective variables and we're putting that into, um, it's more of like an informed algorithm then in, I don't, I don't know if it's entirely AI, but um, to give a training readiness score. So how ready are you to push yourself today based on this, um, big set of data that we have on you. Um, and then Natalie

AI and the Quest for Olympic Gold (Completed 06/27/19)
Transcript by Rev.com
Page 3 of 16

can take that and work with their coach to figure out what they're going to do it today. It doesn't obviously doesn't restrict someone from training, but it just gives another round piece of information beyond the like, yeah, coach, I feel good. Put me in.

Jemele Hill: Now, how do the athletes themselves, um, or what's been you guys experiences into how they respond to the data that they'd been given? Are they a bit intimidated by it or do they honestly see this as, as real help for them in advancing and furthering their careers?

Lindsay T: Sure. I mean, I can stick on the topic of sleep. So, um, we're often blind to what happens in our nighttime sleep. It's hard to do. Think about with consciousness, something that happens in a state when you're not conscious, which is when you're sleeping. So to have objective parameters around that is really helpful. Like, my most common concepts as an athlete comes into my office and says, Hey, I heard you do some sleep honorees. Yeah, you interested? Okay, let let you know. Let's give this a go. Say, well, you know how, how long do you sleep on average and knife threat? Eight hours. Cause like this is the answer you're supposed to get. Okay. Well what time, what time do you get into bed? Probably 11 1130 is it you use your phone? Yeah, I check Instagram before I got it. Okay. What time do you have to get up for training?

Lindsay T: Well, maybe six 30. I'm like, okay. Doing a mat. 11 30th, six 30. You know, we're not, we're not even at eight hours. Um, so to have information about what happened there, right, until for an athlete to understand like I am in a heavy period, I am exhausted. My, they probably won't use this word, but it's in the sleep medicine literature. This non-restorative sometime features of sleep that occur as you are coming from the threshold of functional overreaching. You're pushing yourself. It's working well. You feel terrible because this is what the training is designed to do. But sometimes you go too far and then you're an overtraining. But so we can, we can sort of see these things in sleep. So once an athlete understands that, that's the value of, um, that, that the data can provide or helps us understand that. Yeah, when you hit the ground in Tokyo, there'll be so many days and it's individualized, um, till your nervous system normalizes and we can expect you to perform the same way that you perform in your, in your home training environment. Um, that's, that's powerful because it's, it's hard to talk around these things and you can get in your head to say like, maybe even just like not that motivated. Maybe I'm not working that hard or what if my coach thinks that I'm trying to make excuses and the objective data helps inform that story

Jemele Hill: enough feel. How does this technology help in

Phil Cheetham: skill sets for certain athletes? Well, yeah, getting back to that as far as the skillset and, and the athletes and the coaches, the skill sets, we've been using it over the past four years for mostly the elite athletes, but it's gonna trickle down for sure. Uh, right now it's a little bit expensive. Um, and hopefully we're making

AI and the Quest for Olympic Gold (Completed 06/27/19)
Transcript by Rev.com
Page 4 of 16

video and the radar technology less than less expensive in the future so we can get it to our development athletes as well. But if I may, I'd like to also make a comment on the athletes and coaches acceptance of this, of this technology. I think we have a difference. Um, the athletes probably in the twenties to early thirties, and the coaches are generally a bit older, maybe 40, 50, some of them sixties. And I think that that is a mirror into how they're accepting the technology. The younger generation is really into social media or cell phone.

Phil Cheetham: So when we can give them a video that has multiple views and that's also what the radar technology can do. There's built in video so we can give them some numbers so they can brag about it on Instagram or post a video of, yeah, I'm in Mike Training session. This was my PB 2123 and, and look at the technique and you've got a video there with three views all on the same video. That really is powerful for them. It's a powerful message and it makes them feel good and it makes them understand what's going on more. Now I have a funny story as far as one of the coaches concerned. Um, he was kind of a bit intimidated by the technology and he wasn't sure that he really wanted it. I mean, he's like, well, I, I'm, I know what I'm looking for. I've been doing this for years.

Phil Cheetham: The typical statement. Um, and so I had to kind of sugarcoat it a little bit from the point of view that coach, you know, you actually get out there with a, with a tape measure and measure each one of those throws this, do that for you. You won't have to run out there with a tape measure. And he was like, the light went on and was like, oh, okay. So yeah, so let's give it a go. And then after awhile he would look over my shoulder and he'd look at the velocity and he'd like that velocity. That's pretty important, isn't it? Yeah, yeah, it is. Oh, that angle, that kind of relates to how far it goes as well. And so within a few, literally a few weeks, it was all of a sudden it was the, his best friend. And, uh, I think that's, that's the way it's, it's education.

Phil Cheetham: If we can educate them how this is going to help them and it is going to make a positive difference to what they're doing, then they're all for it. Is there a fear among coaches that this data, um, maybe we'll run counter to some of their coaching methods, but also maybe from a point of insecurity that they'll start thinking, oh, the robots have one, they'll soon be replaced. Yeah, we do get that. And there's a lot of intimidation between, between what if it shows something I'm telling them to do is not working or is wrong and you've got one coach that that's fixed in their ways and that's intimidating to them. But you've got the other coach was like, well, if I am wrong, I really want to know about it because I really want to help my athlete and so let's fix it. Let's find out what's going on. And as far as automating and taking their job away, no, I convinced them that it's actually helping their job. It's making them more intelligent. It's a tool that they've just got to learn to use. And like I said, it's all about coaching education. If we can educate an athlete, we can help one athlete. If we can educate a coach, we can help 10 athletes. So we're really trying to show the coaches how we can use this scientific technology, how it can help what they're already doing and just augment it.

Jemele Hill: Yeah. And I'm not to forget the, the other question. Um, this is, uh, some of the work that you're doing. Um, you're able to, allows athletes to really find out what their skill sets are and where they need to maybe work more ad or work less at or just how to provide a more balanced training approach. Can you talk about that?

Phil Cheetham: Yes. Well that would be a good, a introduction to another area that we use, which is called motion capture, motion analysis. The radar kind of gives us four or five values. It's more of what the outcome is, what's happened, how the shot put, and I'm using shotput as an example, but it can be applied to all different sports and different events. But we want to know what caused that, what did the body do to make that happen? And so now we need to go into an area called motion capture in motion analysis. And that allows us to measure how the body is moving and what it's doing. And as you say, what is the skillset? Where are they lacking? Are they too weak? Are they too slow? Uh, they not coordinated in their kinematic sequence so they not sequencing correctly. This is where motion capture motion analysis is going to come in. Uh, and that's something we can talk a little bit more about as we go.

Jemele Hill: Are there particular sports, I mean, can either of you or both of you provide us with some examples where, um, this technology is already being used is helpful? Um, because there's some sports more so than others that really seem to be embracing what this approach can do. Okay.

Phil Cheetham: You want me to go on that one? Well, you can stick with yeah. Raider stuff and all the talk about, yeah. Yeah. Um, so we're using it across sports. And one of the things we do with the technology and innovation group is we try to find projects that will be multisport relevant. So not just fixing shot put, but if we can do motion capture, motion analysis, then we can look at gymnastics, we can look at diving, we can look at a running, we can look at many, many different sports. And so this technology can help us keep, as I said, and bring out the key performance indicators. So you wanted some examples? I mean we could look at, we've looked at long jump for example, I work a lot with a track and field and the throwers and the jumpers. And so in jumping, we're interested in how fast they're running because that's a key performance indicator.

Phil Cheetham: We're interested in what their angle of takeoff is. So we're using this technology mostly with, it's quite surprising how standard video is still used today, but we're trying to go to the next stage. We're trying to go to the intelligent video, which now brings in the use of AI so that we can put that video on the side of the lung jump run up and we can immediately give them the feedback of, Oh, you need to change your angle by one degree and increase your speed by a 10th of a meter per second. So those are the sorts of things, the sorts of examples we're using it in diving. Um, and again, I'm using examples that I know of if we can do it in diving and springboard diving and we can tell them the height of takeoff and the rate of spin and we can feed that back directly on the video, then the coach can say, Aha, that's what's happening there.

Lindsay T:	And I'm in for sleep monitoring as an example. It's, ah, all of our athletes, Olympic Paralympic summer, winter, everyone in this room hopefully is sleeping at night, assuming we're all dire. No. Um, yes. So that's, I mean it's, it's pretty widely spread. There are other projects that seem to be more suited to specific sports. So a brainwave stimulation for one has, um, a pod of users. Cyclists seem to be taking, taking to it quite well because it's a headset that is worn and they can wear it on a trainer. Um, and there's some evidence that we're pretty excited about that, um, suggest the stimulation to the motor strip changes the way that, um, the brain communicates fatigue down to the muscles so the muscles can communicate fatigue up, but then the brain can communicates fatigue down, which is so, so this temporarily, I don't want to say disrupting, but temporarily delaying that process allows an athlete to push themselves slightly further than they were able to push themselves previously because they don't feel the same sensation of fatigue. So endurance sport athletes, I'm in this example specifically cyclists, um, seem to really like the, uh, transcranial direct current stimulation.
Jemele Hill:	No. Do you find as well that there is a, cause, you know, we know that there's a certain amount of machismo toughness that are built around every sport and for a lot of athletes, rest is not in their vocabulary. Correct. So how do you combat that? This is a great question. Um, so usually with
Lindsay T:	data, so there's ad data suggesting that, uh, we could randomly sample, pretend we're all football players or baseball players. We could randomly sample our own reports to how, um, how likely it would be would be for us to fall asleep and in certain circumstances. So this is a standard as standardized as sleepiness scale where you, you literally just report on a scale one to three, how likely is it for you to fall asleep when you're sitting in a meeting, driving in a car or sitting as a passenger in a car, laying down in the afternoon. Um, and then you can track our performance across multiple years. And the higher the more sleepiness that you report today, the less likely it is for me to be in the league years later. And, and not, not by an insignificant amount. I, I can't remember the exact, the exact numbers, but it's something like a 40% spread across.
Lindsay T:	Like, so let's say you, you know, you have a very low sleepy value in a high about high sleepy value. You're 40% more likely to be in the league in three seasons. So once athletes understand, um, that like if you've signed up to through your profession, if you're lucky enough, like genetically yet access to coaching, you know, being able to invest yourself. If you undermine your recovery, your, I can't guarantee it, but I can say it with a lot of confidence. You are going to shorten your career and it's something that's in your control. All, sir. I mean other things that are going to happen, right? Like you could get injured, I mean, who knows? You could get cut, but why not focus on something that's in your control and take advantage of it. So I hopefully can undermine your match. He spoke by selling you on the idea of recovery.

Jemele Hill:	Well, we'll have to talk after the panel about why I always fall asleep in cars because I just can't figure my sleepiness scale is like super high end cars. I don't know what this is and on planes, but yeah, that's a fort, another panel one of these days. Sure. Um, you know, what may most people I think, um, especially fans in particular, I don't know if they have a real sense of what that good to great leap is and just how minuscule the margin for error really is, particularly at the Olympic level. How does all of this, um, from out of artificial intelligence, the data gathering, uh, to the motion capture, how does this help to sort of reduce that margin of era, if you will? Well, I think that as you mentioned, we're getting closer and closer. It's a thousandth of a second. It's a centimeter that wins a gold medal and then you've got a silver medal because you are this much shorter.
Jemele Hill:	So I think it comes back down to the technology being able to measure what's going on, not, not in the competition, but in practice. So now we know for a fact what your key indicators are, how you're doing it to every training session. So we can plot those in it. And I think that the important point is we can track these variables accurately. That's key. And over a period of time so we can see where you're failing, where you're improving and how to improve each one of those different parameters because we're measuring them without measuring, you're just guessing.
Lindsay T:	Yeah, and I, I'd say it's a, it's a combination of using sophisticated technology and then it's a combination of, um, maybe some unexciting ideas, like no spending adequate time in bed showing up to training every single session. And that's often multiple sessions in a day with a clear agenda of what you want to address that day. Um, communicating clearly with your coach about what's going on and what are the expectations and being planful about how you're investing your resources. Um, yeah, like Phil said, I mean the margins are so small and then I think being scientists on staff at the Olympic Committee and other National Olympic Committees or general sport organizations, I mean, we're sort of surveying, um, published literature and saying, okay, if you're seeing a 10% gain in this collegiate or the semipro population, what if it converted to half a percent of a game in our population? Like it is worth paying attention to? Um, so we're, yes, high tech but also some of the, um, lower tech things of just putting your shoes on the right feet in the morning. And I think that
Phil Cheetham:	tech helps us to look at the, as you say, the low tech and it allows us to look at the differences between quality and quantity. I think that's really key now. We have to be very smart in the way we train. And so if we can have a much better quality workout rather than just working five hours, work three hours and do a really good job of it. And the measurement and the recovery that all allows us to, to be more mindful and to be more accurate in the way we do that.
Lindsay T:	Hmm. And I didn't want to Belabor the point, but you're saying mindful. So years ago I was um, in Chula Vista at the training center there and working with

the archery team and we were doing mindfulness sessions after lunch. I also do this brainwave analysis to sort of understand the critical patterns of, of, of what's happening in the outer layer of the brain and what's associated with, you know, sort of good shots and bad shots. Hmm. So there were some athletes who, um, we're sort of in my line, like chewed up to, you know, sort of be the next one is just sort of look at this and you have to record a lot of shots to have some sort of degree of confidence in the recommendation that you're going to make to the athlete. But, so let's say like, I saw an athlete, for example, we'll call him Joe.

Lindsay T: Joe Wants to do the bandwidth analysis. Okay, Joe, you're falling asleep four out of five days per week after lunch during mindfulness, you're falling asleep, which is like, I'm just not even to mention, I, I'm, I'm not actually offended. You need the sleep, but like, you're not rested enough for us to do this more sophisticated thing of brainwave analysis and intervention or even with the brainwave stimulation with, with the halo headsets as an example. Um, if you were tired, there's, there's no amount of sort of fancy things we can do in the day with technology to give us the 1% when the fatigue, the tiredness and the sleepiness is going to undermine your, it's going to reduce your performance because it acts like a, uh, a load on your nervous system. So I know it's less exciting to be spending more time in bed and getting more total sleep time at night, but, um, you know, first things first, I can like a, like a good coach won't let you make your progressions without great foundations and basics. Let's, we're not going to go to the tip of the iceberg when we've got, well, I'm not a dietician, but if you have poor nutrition or you're dehydrated, you're not well rested. You, you showed up without the right gear. I mean, you, you're not going to become the best in the world with, with the missing foundation. Yeah,

Jemele Hill: I mean, it's interesting because there's always this, um, tension and argument about athletes and resting, right? And a lot of it has to do with people knowing how much money some athletes make or what the, the skin they have in the game. And they have this idea that they should be, you know, going out there and just killing themselves all the time. And that's the only way that they can get better. And so this is providing kind of a, almost a, a one 80 look at how different it is. It's not the more, you know, it's not the more you exhaust yourself. It's actually the right in many respects.

Lindsay T: There was a, there was a very unscientific investigation by Xeo, which was asleep device. It's no longer in business, but according to Zero Lebron James and Roger Federer, we're spending 12 hours per 24 hour cycle in bed asleep. And when you appreciate what they can do with their body and their brain when they are playing tennis and basketball, like you better believe they need 12 hours in bed.

Phil Cheetham: Hmm. Great. And I think we're looking now at the holistic approach and you mentioned it nutrition and you mentioned sleep and recovery. What we do at the US Olympic and Paralympic committee is we have a team of experts around

AI and the Quest for Olympic Gold (Completed 06/27/19)
Transcript by Rev.com
Page 9 of 16

each of the different sports. We have portfolios of sports and we have high performance directors and then we have nutritionists, we have sports psychologists, we have Lindsay's to the psycho physiology aspect of it, strength and conditioning, biomechanics, sport technology. We try to put a team of experts so we can help them in whatever it is that they're having problems with. Not just trying to force our expertise because that's the only guy that's working with them. So if it's, if it's a hammer, then it's going to be a nail. If by a mechanistic it's going to be motion analysis. So no, we work as a team and we discuss the athletes every couple of weeks. We've got what they're doing in nutrition, we've got what they're doing in sleep, we've got what they're doing in technique and we've got Red Greens and Blues on each one of a blue, red and greens and yellows on each one of them. And we have discussions about them to find out which aspect it is that we need to help that they need help in. Yeah. And I just want to give everybody a warning. Probably in about 10 minutes we're going to open the floor for questions. So if you have any hobbies. Yeah,

Jemele Hill: those I'm ready. And we'll have somebody with a microphone that will come around and get those from you. But before we get to that part, one of the, in the video, um, about the radio technology said, you know, we have to do this if we want to keep up with the rest of the world. So when it comes to embracing and using this technology where, I mean, I don't expect you to maybe that you don't know an exact ranking per se book, but how are we doing in this area compared to what other countries and how they're developing and using technology with their athletes.

Phil Cheetham: I think before Rio we had kind of a wake up call. The bricks we were doing a lot with because they've been funded through lottery funds. The Germans were doing a huge amount of Australian Institute of Sport. It really helped to Australia and we really wanted to get on the map and start, uh, not only keeping up but surpassing and using the technology in, in thoughtful ways. Um, so we put together a technology and Innovation Fund with some high powered gentleman from Silicon Valley. Um, they put together the fund, they put their money where their mouth sir and actually started funding projects and that's been going on for about four, four years now. And it is really starting to make a difference. We have the high performance directors from each of the national governing bodies of the sports put in their project to our high performance director and then it gets submitted and we, we basically go through and rank them and come out with the best ones. Um, and the best ones of course they're going to be the ones that are multisport that are very basic to all different sports like the sleep and recovery, like the athlete management system, like the motion capture, motion analysis. Because once you've developed one of these for one sport, you can very quickly bring it across to the other sports and that's going to help us, um, improve our technology much more rapidly.

Jemele Hill: Um, for most fans who watch the Olympics are really moat, any sport, it's an emotional experience. Um, I think a lot of fans would like to, to believe that most of these athletes, they were successful. I'm just purely based off God given

ability and some lightning bolt struck them out somewhere. And next thing you know, they were you saying bolt, as you guys know, that's not quite the way that it works, but why should friends be interested, um, in this kind of tech and where it's taking, um, our Olympic programs in Olympic teams, in Olympic Olympic athletes?

Phil Cheetham: Well, I think that that in this day and age with technology everywhere and with cell phones and smart phones everywhere, we're just seeing more and more graphics. We're seeing more and more information and I think now they want to know Joe, not just the stats of the game or the match, but they want to know the stats of each athlete. And the stats, the statisticians are looking for more and more information. And so I think I've seen it much more in the last few months on television. I know on the golf channel when you're watching the golf now you can see how much hip turn was in the backswing, what was the velocity of the board. You can ball, you can see the trajectory of the ball, but they're getting into more and more of the buddy. And I just saw one the other day a on baseball where it was giving the of the ball and the trajectory of the ball. I think it just adds to the excitement and the interest level of each of the sports.

Lindsay T: Hey, I think maybe as a, as a fan or a viewer it helps again like quantify like what is it that makes it so appealing to me? Like, like that is marvelous to watch, you know? And it may be, it anchors it into some sort of number. I mean hopefully people can still have like sort of the aesthetic experience and like soak it up. I, I think, um, so why do fans care? Hopefully there would be a trickle down effect of um, high quality, valid, reliable, you know, these as an example and there's probably at least half the audience here who has some type of sleep tracker. You sort of tried to measure your sleep at night. Maybe it's on your phone or the accelerometer. Your phone gets stuck underneath the pillow. It thinks you're asleep, you went in the back, you know, there is, um, there were, uh, different ways of um, uh, of, of measuring things mean like measuring core body temperature when you're an endurance sport and exposed to sun and heat and humidity mean that matters a lot. And then there's little temperature pills you can take and monitoring, monitor thing. So, so hopefully as feel sad, radar technology IX is expensive at sleep technology, less so, but hopefully to the, um, to the person sitting at home next summer watching the Tokyo Olympic and Paralympic Games. Hopefully there'll be the beneficiary of um, the, the committee's efforts to sort of track down, um, the most impactful tools, technological tools, and um, whether you're a weekend warrior at uni or whatever it is that, that you could somehow benefit from this too. And you're, in this case athletic endeavors.

Phil Cheetham: I've got one immediate example that just comes to mind of how the weekend warrior is now starting to benefit from this technology. And it's really in line with the technology that I've took, been talking about. It's not just the radar but it's the video. Now with the video, we use multiple cameras from multiple angles and those have to be synchronized with one another. So you can just flip

on the iPod from one view to the next view. And it's at the same point in the skill. So if it's the, the ball is just being launched or that the ball is hit the tennis racket and, or the athlete has just jumped off the ground, you want to be able to flip through that. One of the companies out there has just come out with that now on the iPhone. So basically if you've got three friends who have three i-phones and you've got an uh, an Ipad, you can just set those three i-phones on a tripod around whatever it is, where the golf swing, baseball swing, whatever, and it transmits them directly to the eye and it's an APP.

Phil Cheetham: Yeah. So this technology was at the Olympic training center level and now it's come down to everybody. So I think that's pretty cool that we're all going to benefit from it in the future. What I like though and what I'd like to see improved, uh, the programs, the goals that are set like 10,000 steps. I have a problem with that. I mean, everybody's not going to do 10,000 steps. Let's get to the point where we're specifically designing the program for you. And so we can do an assessment on you and then we can design your program and then we can measure it in. Again, I keep using the word thoughtful manner. That's what I'd like to see in the future, not just shotgunning all this technology out there. Technology is useless if it's not used in the correct manner.

Lindsay T: Well, this a wedding dress I have to fit into says I need 10,000 steps a day. But that's all to the extent that that motivates you to take 500 more steps in your day. You just keep that in your mind. Right? It's like you really behavioral guideposts. Look a Dr. Lindsey, we gotta work on my sleep. That's what I'm saying. Okay. Then we'll get to the second metabolism. I mean, there's so much, there was just this great sleep conference time restricted eating. Yeah. There's, there's so many things and we're going to start looking into it. Is there a way that athletes can time their meals that will help facilitate, um, jet lag adaptation? I mean, there's, there's, there's so many exciting things, um, in the sleep world, but in other ways that we can look again at these behaviors that we're going to do anyways, hopefully.

Lindsay T: Um, how, how can we reprioritize them or how can we reinforce certain behaviors and, um, sort of steer people away from other behaviors? Like if you understood the impact of consuming one alcoholic beverage at this time versus many across this amount of time, if you understood the impact on your nighttime sleep and if there was a metric around that that could really drive your, your behavior with athletes, I'll often say like, you want to socialize, right? You're 18 to usually 35 years old. With the athletes that I work with, um, you should socialize because they're social beings and we'll, we'll knit. So I had, I'm a rock climber recently. If you didn't know this rock climbing will be in the Tokyo Games. I had a rock climber say to me, my friends like to parties. Okay, well this is good. Um, well like, define party. He's like, well, we stay up all night.

Lindsay T: That's okay. What is all night? We don't go to bed til probably sunrise. Okay. How, how many times are you doing this in a month? I don't know. Like five. Six. Okay. Well let's, let's put a metric on that. I'm not your mother. I can't tell you

AI and the Quest for Olympic Gold (Completed 06/27/19)
Transcript by Rev.com
Page 12 of 16

that you can't do this, but if you understood how this impacted your ability to be planful the next day, sustain your attention, be vigilant to the routes. I'm um, I'm not, uh, I'm not a great climber so I don't understand all of the exact demands at that, the athlete encounters. But if, if you understood the impact, the, the, um, cumulative impact of that type of sleep restriction, um, I bet you'd make a different choice, or at least you at least you could make an informed choice next month. Maybe it goes from five times to two. That's going to be that via an idea.

Phil Cheetham: I think the cool thing about all of this work that we're doing at the Olympic Committee now in the Paralympic Committee is that our goal is to bring it down to the consumer level. That's one of the new edicts that we've got is all of the information that we learned for the elite athlete has application for the weekend warrior and just general health and fitness. And I think that that's one of the things that we're trying to progress to in the next few years is to help the USA population in general.

Jemele Hill: Hm. Um, we're going to open the floor for questions. So raise your hand if you've, there's one, that's it.

Speaker 6: Hi.

Lindsay T: I was wondering if you, if the UFC or any other countries are getting pushback back from the International Olympic Committee about any of this technology potentially deeming it unfair and therefore banning it.

Speaker 6: Yeah,

Phil Cheetham: not too much. No. Well, it's interesting you asked that because we have, um, sponsors who helping us work on technology such as Intel and Comcast and several others. Um, but they're also IOC sponsors as well. So they're actually implementing technology projects at the IOC level as well as at the u s o c level.

Jemele Hill: To follow up on that, are there any, are there any ethical concerns that people have about how this technology and data is used?

Lindsay T: Yeah. So, so the example that I gave before of brainwave stimulation, um, direct current stimulation, Eh, there, there's been, um, a pondering in the literature, whether or not it is, it could be considered a performance enhancing drug. Um, and you know, the, the, the thought, um, thought project is, is sort of lagging behind the way technology is interfacing with athletes. So, so in that case, I doubt much will happen, but I think there is, um, there are, uh, you know, a appropriate concerns. Um, I'm, I'm not, my, my personal opinion is, I'm not concerned about, um, DC stem conferring and unfair advantage. The cost of the technology is, is quite low. I mean, certainly there are versions of headsets that are very expensive, but the technology in and of itself has been used for

decades. Um, and, and it's quite unexpensive so, but it, but it is, it is an interesting sort of dilemma to consider.

Jemele Hill: Good. This, um, uh, eventually, uh, and maybe even currently, but could this eventually have a real significant impact on the longevity of athletes? Like how long we're used to, especially in Olympic sports, seeing them retire at age two, the rest of this pop, the rest of the population is like, that's very young. But if you're a gymnast and you're 30, that's not happening. Right? So could this really impact their longevity?

Lindsay T: I would. I hope that if you, uh, I mean, so there were biological limitations, you know, for example, in gymnastics and figure skating, but I don't know, perhaps diving now that's not to say that there haven't, I would say recently been older athletes, you know, what is considered to be in early specialization sport. But, um, one of the, one of the approaches we are taking is how do we prolong the, the careers of these highly successful athletes. So if you were very successful or if you were afforded to eighth place finisher in Rio in the last games being, what is it? Is there something that needs to be addressed to enhance your performance and how do we invest in your, in your recovery, um, to get you to 20, 20, assuming that's something you want to do and you can prioritize your life around that.

Lindsay T: But, um, I think that, um, the way we think about, uh, how our bodies are aging or, or breaking down at the most elite level in sport. I mean I've just, I can, I can think of a of a handful of athletes who did very well in Rio that thought seriously about retiring and then, you know, I'm in the best shape of my life. There's no reason other than sort of this, you know, this idea of this, the certain number this age in my mind for my sport, I'm considered old, but I'm one of the best. And when you put wisdom with a, with a well maintained body, it's, I think it's hard to be,

Phil Cheetham: I can give you a specific example of that and how technology can really help. And, and again, I get back to the gymnastics example and workload monitoring or training load monitoring. If we can use AI to turn that video camera that's trained on the parallel bars, trained on the rings, trained on the High Bar in the gym, in their workout gym. If we can now take that video and feed it through an Ai Ai Algorithm that can count the number of skills they can do, can log the type of skill, can log the quality of skill, can put it into their logbook, which now instead of just being a piece of paper in a book is now in the athlete monitoring system. We're doing this already by the way. Now you can start in a limited sense. Now you can start looking at how they're being affected by the amount of work they're doing. You can start period icing their workout so you can back off. You can load heavier, you can load lighter, you can, you can cut back, you can taper. All of these things can help the athlete do better in a competition, but remain healthy. If the athletes not in the competition, he can't win it or she can't win it. So if we can monitor their training and workload in a in a very skillful manner, then I think the longevity thing comes along with it. Yeah.

Lindsay T:	Again, we have a couple more minutes for questions. Mr Tinsley.
Audience Member:	Uh, just with the, the data that you all collect, I can see that being really useful. Like outside of Sports, how have you noticed the, the feedback from the medical community or even something like military? Cause I could see like navy seals using the step information, it really helped them as well. Have you noticed outside fields
Phil Cheetham:	you got something on that? I mean I can talk a little bit about sleep, but if there's something that, sensors, yeah, I think, I think we have an interaction, especially in San Diego, at the Olympic Training Center, we've had interaction with the Navy seals and I think we do share a lot of information back and forth as to what's working for them. And you know, when you've got the crazy elite athlete and the, and the, uh, military person there working at the same sort of level. So yeah, there is feedback going back and forth and we've got several performance human performance seminars where the military guys give us their information and we talk about what we're doing. So I think that, yeah, it goes both ways.
Lindsay T:	I just want to give one really great example of that. So we have different vulnerabilities to sleep loss as an example. Um, so the, the, there's this, this task called a psychomotor vigilance task, which is a very boring tasks that you sit there for usually about 20 minutes and you just continue to respond to something on the screen. And you know, the, the software accounts, your reaction time, your reaction time variability, things that you missed times you press the button and you shouldn't have all these things that have rolled in a real world translation to, um, like military style tasks. But, um, so there is, we don't, we don't have a good understanding of the exact genetics that gives this ability that sort of buffers you from the cognitive cost of sleep loss. But if we know that about you or if there's a way that we can detect that those are the wildfire firefighters that you deploy first when you know they're tired, right? Because you know they're going to be a little less likely to make a mistake or those are the astronauts that you send up on some sort of exploration Michigan. Those are the people that you, you keep on a longer shift compared to maybe someone who's more vulnerable, um, to, to the costs of something like sleep loss. So we're going to, at least when I'm working with athletes, I'm borrowing heavily from these other high performance literature, you know, astronauts, soldiers, what's published, that sort of stuff.
Jemele Hill:	Real quick, quickly along those same lines. Um, it feels like in the American professional sports community like basketball in the NBA they have really, you know, adopted a lot of technology at you know the guy, the team I go and stay with like for a long time was kind of really in the driver's seat as far as that kind of a conversation. Are you also sharing a lot of information? Not with just the Mba community but we like the NFL is there across sharing of information with the professional sports leagues in America about the technology that have and

even from a sleep standpoint what you're discovering and the at the Olympic level.

Phil Cheetham: That's one of the things that I'm kind of in biking on at the moment with the technology committee and the technology group at the Olympic Training Center we have some of the members on there that are in professional sports as well. And so yes we are trying to pick their brains and when we see at conferences stuff that's in basketball stuff, the in baseball we definitely share and I think we get quite a lot, quite a level of sharing. I mean, it goes only so far and then it stops and says, well, we're not going to tell you anymore, but at least we can find the products that they're using and the sorts of technology to that are going in that direction. So I think that that's one of the goals to try and, uh, access those experts because there's so many experts in the professional fields.

Lindsay T: Yeah. And even that stuff, like clever approaches, like, so the resist one study that was published about on the incidents of late night tweeting and then subsequent to that, you know, next day game performance of which was just, that was so clever, right. It's public information. If you are tweeting, you're not asleep unless you've got someone else tweeting, you know. But like, if there's often these great ideas that come up on, yes, okay. We, you know, we can sort of borrow or steal 'em with these clever ideas.

Jemele Hill: Definitely. Well, thank you all for being exceptionally clever on this panel. Um, a round of applause for,

Lindsay T: uh, our experts here or fill in the Z.