Episode: 26

Alfonso Oliva

THE MOBILE WORKFORCE PODCAST

Mike Merrill:
Hello and welcome to the Mobile Workforce Podcast, sponsored by AboutTime technologies and WorkMax. I am your host, Mike Merrill. And we have the opportunity today to have a wonderful guest, Alfonso Oliva, director at LERA Plus and an adjunct professor at Pratt Institute in Brooklyn, New York. Alfonso is a highly regarded expert in structural engineering, as well as an installation artist and a skilled sculptor. Today, we're talking about structural optimization technologies and how these things are being used today in construction projects across the country. Also, how construction firms are bringing a new level of creativity to structures around the globe. Hello Alfonso, thank you for joining us and welcome.

Alfonso Oliva:
Hi Mike, thanks for having me first of all and hello everybody to all the listeners.

Mike Merrill:
Awesome. Well, before we get too deep into the conversation part of the podcast, can you tell us a little bit about your background and share some of your history?

Alfonso Oliva:
Sure. I'm originally from Italy. I was born in the south of Italy, close to Naples and that's where I started my studies. I started with surveying engineering, that is somehow related to what we're talking about today. It's still in the engineering field. Did a lot of that and then that's where my engineering path that brought me here started. I signed up for civil engineering in my university in Cassino and I took my bachelor there. And then while when I signed up for the master, I had the opportunity to basically apply for a scholarship. That is what brought me here in New York. I applied for the scholarship. I won the scholarship and I came to New York and I basically started a mastery thing where you instruct engineering with a focus in structural engineering. Finished that master, went back to Italy to finish my other master in civil engineering. And then I came back to New York to start working.

And that's when I started working on tall buildings. Doing that, I found a lot of processes that were repetitive in my opinion and I wanted to cut down and that's where the optimization starts kicking in. I got interested in that. I started another master in computational design with focus on optimizations at Stevens Institute of Technology in New Jersey. Completed that while I was working. I was applying those concepts there. I moved to another company, it's LERA, where I'm working today, started the LERA Plus group, thanks with the support of the partnership. And then while at LERA, since we are a research group and I'm passionate about research, I started a PhD in computational design with focus on sculpture design. As matter of fact, LERA Plus today focuses on the arts. We've talk more about that but of course also works very closely with LERA on tall buildings, museums and all the likes.

Mike Merrill:
Wow, you must love school.

Alfonso Oliva:
Yes. Research and learning more about processes is one of my passions.

Mike Merrill:
Yeah, that's amazing. I was looking on your LinkedIn profile and it just kept reading education, education, more education. You're working on a doctorate degree now, is that correct?

Alfonso Oliva:
I actually completed my doctoral degree in January this year.

Mike Merrill:
I didn't see that congratulations!

Alfonso Oliva:
Yeah. Maybe I didn't update my LinkedIn profile but that's done. And I think I'm done with school for now, I think.

Mike Merrill:
Congratulations. You still have long black flowing hair. There's no gray, so you've done something right.

Alfonso Oliva:
There are some, I'm not going to get close to the camera but there are some.

Mike Merrill:
Love it. Well again, thank you for joining us today. You're certainly very, very experienced in some pretty exciting projects. I know that LERA Plus has worked on such buildings as the world trade center, freedom tower, buildings, two, three and four in New York City and a lot of other iconic structures. What projects are most fascinating to you that you've worked on to date?

Alfonso Oliva:
Oh, very good question. A difficult question, honestly because LERA works on a lot of interesting projects and I think that's what I love about the company. It's very diversified. We work from anything that goes from super tall buildings all the way down to the design of a chair. We span across all of that. It's a very interesting question. I must say that one of the projects that was the most fascinating in terms of complexity yet simplicity, is definitely the Lucas Museum of Narrative Art. It was a very interesting project. We went through many different phases. It was actually supposed to happen in Chicago and then the project was relocated but the complexity technically was definitely due to the geometry itself, right. It was a big challenge for us but also a big, exciting moment. We were able finally to put everything together, to put all the research effort and the computational processes, with the longstanding experience of LERA into engineering. What we did here is that we developed new systems. We developed new piece of softwares or extension for software to support three different processes.

One was the engineering processes. One was the beam process. And the other one of course, was the computational process. The computational process was sometimes bridging across these two. Sometimes it was bridging across the architectural and the engineering and sometimes was bridging across the engineering and the construction. It was a complete process, a complete optimization of the process. And I must say that the final result was very exciting for the whole team. You need of course, in this kind of projects and in this kind of advanced workflows ... That's how I like to decide to define them. You need highly trained people. And that's exactly what made this successful. The highly trained people are not only within the LERA Plus group but they extend within LERA. We have experts. The engineering side understands what we are doing at LERA Plus. The people in the beam department understand what we are doing in the LERA Plus department. And that's what makes that optimization of the workflow successful.

Mike Merrill:
Yeah. That's very fascinating. I can't help but think when I hear you speak about this, the details and the level of involvement of so many parties, it sounds like very little happens on accident in these types of structures that LERA Plus is working on. Is that right?

Alfonso Oliva:
Definitely, definitely. That's one of the main benefits, I will believe. You cannot blindly rely on what the computer is doing, if we want to define it like that. Meaning, you cannot just drop an algorithm in the process and hope that the algorithm is actually doing something for you but you need to closely monitor what's happening and have your engineering judgment applied to it. If you do that, then what happens is that you are actually benefiting from that process and you get to a closer level of detail, just to get to your question, right because all the sudden, you save all the

time that you would have put into what the algorithm is doing and you can focus even more on the detail. You can be, "Okay. Now, I can trust this algorithm. I'll keep monitoring. I'll make sure that it's doing what I want but I can also look closely at what it's doing at another detail because I have more time."

Mike Merrill:
What I'm hearing is the creative genius, as well as the applied understanding of that design, is always a critical or secret part of the equation. Would that be correct?

Alfonso Oliva:
Exactly. There is always a mix of that, the engineering judgements will never be left alone or it will never be taken off from this. It's actually a very strong integral part of it. And that's why we were able to create all these processes and melt all these different group of people together.

Mike Merrill:
Yeah, it's amazing. I've traveled the world in different places and seen many of the buildings actually that LERA Plus has been involved in. When I go to the website, I think I probably saw at least a hundred and would lose count. And many of them are familiar and very infamous buildings and structures. What aside from just working on these types of projects, sets LERA Plus apart from other companies?

Alfonso Oliva:
Oh, interesting question, Mike. I think I should probably say collaboration and I know that this word might sound a little bit simple for such a complex question but it's exactly what it is. And allow me to mention a couple of examples here, LERA Plus ... Basically, I am not LERA Plus, right. What LERA Pluses is, is a set of people coming together and creating that research environment. We have a lot of internal collaboration.

I'll give you an example. One of the co-founder of LERA Plus, Nidhi Sekhar, she's been with me since the very beginning of everything. It's accomplished a whole other series of tasks, right but that joins very much with what I'm doing. And then there are people in the engineering field. One of them being Antonio Rodriguez that has been leading our virtual reality research platform that also plugs in into what we are doing very tightly and keeps reinforcing that group. That's one of the reasons why LERA Plus today, it's still alive and it's actually expanding. As I mentioned before, now we are heavily involved into the arts and we are designing ... We are expanding our business into sculpture design, both for the engineering optimizations and computational design.

Mike Merrill:
Alfonso, tell us, how do experimental projects encourage creativity throughout the construction industry as a whole?

Alfonso Oliva:
Yeah. Experimental projects are the key. This ties directly back to the first observation that you made on me basically being constantly in school since I was born. And the reason for that is because I had ... This was like more like 10 years ago or 12 years ago I should say, when I started working in New York. I felt that it's very difficult to do your job, meaning design your structures and at the same time, keep that research going, right. That was my reason to continue my studies back then, right.

All I'm trying to say here is that experimental projects are nothing else than an extension of the projects that we do in school, right. It's basically our need for basically feeling that something is new, that something it has not been done. And it's also a big question mark. Why not? Most of the research that we do, they ... Some of them actually, I should say, I don't want to say most of them but some of them, they actually do not have an aim, right. We are shooting in the dark. The reason for that is because we want to also consider things that over the years has been considered not good, impossible, not efficient in the field. We try with a small percentage or with a bit of the percentage of our research, to basically try to reinvent processes. Expand the projects that are ... I would say, they are part of the foundations of the whole innovation process.

Mike Merrill:
Yeah. I love that. We're at a software company here at WorkMax and I know that from time to time, we'll have what we call a no bad ideas meeting, just to reset the stage and to get the creative juices flowing again. And it sounds like you learned that from your studies and in school but that actually gets applied practically when you are out in the field, working on these real projects.

Alfonso Oliva:
Yes, definitely. Everything that basically goes into the research projects. All the effort that goes there, it is not wasted. And we actually get that or part of that, that's the beauty of all the different process that we develop. And we basically apply that in a project that actually gets built at the end of the day.

Mike Merrill:
Yeah. And I keep thinking of the … I don't know the exact quote but Albert Einstein basically talking about the thousand times of failing was learning a thousand times it wasn't going to work. He was that much closer to the actual end result that he was after.

Alfonso Oliva:
Exactly. Yeah. Failing is also always going to happen. And it's a good thing. I think having that emotional roller coaster through a research project to a design process makes everything more interesting, right. At the end of the day, we are humans and we want to be connected also with the human side of feelings. And that's what motivates us the most.

Mike Merrill:
Yeah. What's fascinating about what you're saying to me, is I'm thinking of the fashion industry and we've all probably seen these shows where there's people in these extravagant costumes or outfits walking across the catwalk and I'm thinking, "There's no way on earth anyone's ever going to wear that in public." It looks crazy, it doesn't look beautiful maybe, right.

Alfonso Oliva:
Exactly, exactly.

Mike Merrill:
The art industry and the comparison there, maybe with what you're doing.

Alfonso Oliva:
Yeah, definitely. It's exactly what you were mentioning before, your no bad idea meeting, right. Nothing is a bad idea, as long as you think it's a good idea. And the reason for that is because over the years, we've built all these barriers. We built all these barriers that we are living within, especially in our industry. And the processes that we have to date, they don't allow you to look beyond those because you need to move fast through that path but if you break out of that path for a little bit, just to explore what's out there … And maybe it's a jungle, maybe it's difficult to see what's going on because it's unexplored. And it has been that for many years but if you start looking through, poking through, looking at all the beautiful trees and all the things that are around, you understand that there is way more. And then eventually, you can reconnect that to the original path and integrate it within the design process. I think that's what's beautiful about innovation.

Mike Merrill:
Yeah, I agree. And even on the technology front, when I think back to when we started in business back in 2003, they had PDAs that were PalmPilots and that was a smart device. That was the smartest device that existed. And then Blackberry came on and now iPhone and Androids and the iPads. And I'm so thankful for these innovators that have pushed technology to where they're able to land today. And I feel like in your line of work, it's a very similar situation.

Alfonso Oliva:
Yes. We hope very much so and we have done … To date, I believe we have brought a lot of contributions to many different fields within our industry, that of course made me and all the people in the group and other people in the company very happy, even about contributing in a different way to a project or to a solution, to a design solution or anything like that. And we always strive to make things very, very perfect and processes even more complex, to then deliver

something that is more optimized the next time and then more optimized and more optimized.

Mike Merrill:
Well, and I'm sure there are many firms that have learned from designs and approaches to solving challenges that LERA Plus has undertaken but also at the same time, I'm sure that LERA Plus has learned from other engineering and design firms to again, move the greater good further down the innovation path.

Alfonso Oliva:
Yes, that's a very good point. I also believe that there has been ... Of course, as in any other business, a little bit of a lack of cross collaboration between different firms. Of course, I do understand the business point of that but I must say that at least in the last ... Probably more in the last five to six years, there are many groups and many collaboration groups. I've collaborated with other engineering firms and what brings everything together, is actually the computational side, that I think it's a beautiful thing because I would love to see more engineering firms collaborating together, more architectural firms collaborating together in order to advance the whole industry as a whole. And I think that happened somehow in the tech industry. That's why they moved way faster than of course, what we are moving. We've been in a period of stall for a long time. And now, we are moving a little bit faster but we are still beyond, I believe.

Mike Merrill:
Yeah. And you're mentioning on the technical side, it makes me think of artificial intelligence or AI. I know LERA Plus is doing some exploration in that area. What exactly is going on there with LERA Plus and also the industry with AI?

Alfonso Oliva:
Yeah. As we mentioned before, we're always up to some research project, this being one of them. This is a research project that is led by Nidhi Sekhar. She's been doing a great job at it. It's of course in the early stages. It's tough to say where it's going but we see potential applications within the fields. What we are very hardcore about in terms of artificial intelligence, is that we strongly believe that it will not replace humans, right. That's something that people have been mentioning in the past and everything. We are not on that train of thought.

The way in which we want to use artificial intelligence, is to basically overcome or even implement those tasks that now are impossible, right. For instance, if you have to do 3000 iterations of a process to match something, you wouldn't do that. You will then basically get a human go through that pain for such a ... Let's say, little reward. That will be a common applications and actually, one of the research projects as we say, that we are releasing in our new newsletter, where Nidhi Sekhar has been working on recognizing a sketch, literally enhanced sketch and then going to a data set of thousands of different sculptures and matching that sketch with existing sculptures. The reason for that is because we want to motivate people in understanding that anything is doable. Anything has value. Your sketch, your scribble that you have here, could be something. Get inspired from these other sculptures that have been built in the past and keep going.

Mike Merrill:
Yeah. Repurposing the work that somebody already did.

Alfonso Oliva:
Yeah.

Mike Merrill:
That's brilliant. When we talk about AI, one of those areas in design engineering is of course 3D modeling. What are the benefits of 3D modeling versus 2D and how is the industry utilizing that today?

Alfonso Oliva:
Big topic here. I feel like we historically and up-to-date actually, believe it or not, that it's still a lot of 2D going on, right. We build things out of 2D drawings but the fabrication process, it's actually ... It has advanced way more, right. We are using robotic arms. We are using all sorts of beautiful machinery that think in 3D, right. What's going on? Where is the missing link? Why are we not advancing? If you look at the complete workflow

from the design, all the way to the publication, what it's missing in the middle. And that is something that actually I've been tackling with a group at Autodesk.

I'm part of the executive North America committee with Autodesk, with another series of brilliant engineers in the field, from all the different companies. And that's where I'm talking about cross collaborations and seeing that happening more and more and we recently actually released a white paper on this topic. How do we go in the middle of the workflow and we change how things are done? For instance, if the engineer carries their design in 3D up until it hands that over to the fabricators, how do we transfer that 3D knowledge and all that data, right because that's all there is, it's a bunch of numbers. How do we transfer that directly to the fabricator without going through 2D drawings and the fabricators having to rebuild a 3D out of that. It sounds like a very simple task but it's not that simple. And it's something that as a committee, we are very strongly pushing in the field and we hope it's going to be implemented soon.

Mike Merrill:
Yeah. I had a chance to read through that white paper and it was fascinating to underscore, like you said earlier in the conversation, that human element is still a critical part to the design process.

Alfonso Oliva:
Yes, definitely. The human element, as I mentioned, even before … For instance, in the case of AI, it's always going to be there. You need that engineering judgment, you need that fabricator judgment and all of that. That's the integral part. All that you want to do, is to basically automate those repetitive tasks or as I used to call them and I still called them, boring tasks that nobody wants to do of course.

Mike Merrill:
Yeah. I understand that. And I'm sure again, a lot of the things that you're sharing are very technical but when you go and see a beautiful building that has unique or almost seemingly impossible characteristics from an engineering standpoint, how can this structure be? And yet it is so beautiful. And I know that there is a lot of work that goes in behind the scenes. You're talking about maybe even hundreds of people to bring a project like that to life and allow us to have the opportunity to enjoy those beautiful structures.

Alfonso Oliva:
Definitely, definitely a lot of people behind that and a lot of coordination.

Mike Merrill:
Yeah. And I think that's the other point with … I used to run track in junior high school or you're on a relay and you're handing the baton off from one person to the next and you have to have a proper handoff in order to continue to execute and achieve your destination or your goal. Kudos to you and your team at LERA Plus for continuing to collaborate in that way so successfully to bring these buildings to life.

Alfonso Oliva:
Thanks. Thanks for that.

Mike Merrill:
One of the things that I keep thinking also, is where can the listeners learn more about some of these topics? Are there any publications or forums or places that you can point them to understand more about what you're talking about?

Alfonso Oliva:
Yes. Well, the first place, it's our website of course, LERAPlus.com or LERA.com. You'll find a mix of information there. I've done a lot of speaking and talks in the past that are available online. One of them that I did for the center for architecture, it's an interesting one because it talks about the intersection of engineering technology. How to live in between the works and how to apply one field to the other and vice versa. If you go … Yeah, on the center for architecture website, you'll definitely find the talk. And of course, we are also on social media, like Instagram and Facebook. Yeah.

Mike Merrill:
Beautiful. What are some speaking engagements or opportunities you have coming up where you're sharing more of your insights?

Alfonso Oliva:
Yeah. As I mentioned, over the years I have been speaking a little bit in many different venues. I'm very thankful for people inviting me to that, both in the US but also internationally in Europe and in Asia. And this year of course, it's a little bit different because everything is online. We might resume maybe towards the end of the year. Some people have been contacting me and they're planning an in-person event. That will be very nice.

Yes, there are different opportunities in Europe that we are still working on in consolidating. There is one that is set in place here in the United States. In November, there is going to be the CODA Summit it's called, it's a conference that is focused heavily on art and the CODAworx group. It's a very interesting group because they aim on connecting designers, artists in this case, people that are in charge of public works and then technical people, so engineering and fabricators and so forth. It's a venue that has it all, this event is going to be in November. If you look for CODA Summit November, you'll find it. And we are speaking there. We've been speaking there for the past two years. It has been a great experience and you meet a lot of interesting people.

Mike Merrill:
That's wonderful. We'll be sure to link that in the show notes so that the listeners can have a chance to check that out. I have to also wonder, what … I know that you work with different software products or solutions companies like Autodesk and other software vendors. What are some of the tools that you utilize in order to accomplish the great work that you're doing at LERA Plus?

Alfonso Oliva:
Yeah. We work with many different software in the company. Part of the workflow or the … Let's call it the typical workflow, even though we do not have a typical workflow. I just want to stress that out. A lot of the companies that we work with, of course, they are McNeel, that is on the Rhino and Grasshopper side. And then of course Autodesk, very heavily involved on a lot of their softwares. The ones that we use the most are Revit and Dynamo. And the reason why I'm mentioning these softwares is because we've done a lot of custom development for plugins for the softwares or external softwares that link to it. And these wouldn't have been completely doable without the collaboration with them, meaning getting in touch with people at Autodesk, getting in touch with people at McNeil and understanding how to do all of that. They've been helping us a lot on that enabling new features for us to expand our tools.

And then on the structural side, we basically use a lot of different products. We use CSI products that are the standards in the US, like SAP2000 and ETABS. And then we also use other softwares that are more common in Europe, like SOFiSTiK and all of that but the idea behind it is to always expand on it, right. There is some limitations that come with the softwares. The reason for that is because the developers cannot, of course, put in a software every single function that any company might need, right. They have a foundation, a super strong foundation that you can start from but then the key is to be able to expand and branch off and create your little workflow from it.

And that's what we do. We've been doing that internally. Three years ago, we actually started a software developer company within LERA, it's called Supple Technologies. The partnership and I'm also a partner of it, Antonio is also partner of it and with that, we've been actually serving clients. We've been developing software, we've been developing plugins for clients to streamline their workflows. It has been very interesting because we served architects, engineers, artists, you name it.

Mike Merrill:
What I'm hearing from all of this and what I love is that I'm getting a very clear sense that the arts are alive and well, they are not dead. Despite all this incredible technology and algorithms and integrations and 3D modeling and AI and all these things, the human element is still present in every aspect of the design and engineering process. And it shows, it shows.

Alfonso Oliva:
Definitely, yes.

Mike Merrill:
Rounding out just on more of a personal level. I just wanted to ask a few questions. What's one of the processes or skills that you've developed over the years that has served you well in your experience?

Alfonso Oliva:
Oh, very interesting questions. And since we are in the personal one and I'm very much of a person I should say, I learned over time to actually believe in my ideas. I think that's a good answer to this question. I must say that at the beginning of my career, I was a little bit intimidated by that because of that part I was talking about before. I was confined within those two worlds. And I was like, "No, I need to do this in order to get there."

And then at some point, I just naturally diverged and I went into the jungle that I was talking about before I got lost but I had a lot of fun in that jungle. And then eventually, I got back on the path with a lot of new things. Yeah, I think believing in yourself is the best tool.

Mike Merrill:
Wonderful. And I was just going to ask what's your personal super power for Alfonso? Is that the same thing or is there something else?

Alfonso Oliva:
Well, part of it it's to basically keep your interests alive. I'm also an artist, as you mentioned before. My gallery represents me. It's not my gallery but the gallery that represents me is in Chelsea. I make sure to keep my art alive, my own art of course, it's all computational art. It's a bunch of algorithms creating things. And that's definitely what keeps me motivated and keeps me going and also gives me ideas for my work at LERA.

Mike Merrill:
I love it. What's a challenge that you overcame earlier on in your career that you've been able to work past and build into become a strength?

Alfonso Oliva:
Huh. A big challenge, it has been to … I must say because a lot of people are going to relate to this, a big challenge it has been, "How do I keep doing things differently when I have to complete this task, right?"

And the easy way to answer that is through an example. When I started working in New York City, I was working on tall buildings. And as I mentioned, I was doing a lot of repetitive tasks and I was like, "I want to automate this but I have no time." … Because the time that I have is the time to accomplish that task and the way in which I overcome that challenge, that I invested into something, right. I started creating a list little by little, all these algorithms that while I was working on my machine, would run on another machine and accomplish the same task over and over again and starting optimizing it. That's how I started basically understanding and trying to overcome that, right. The way I should answer your questions is through validation. Meaning, you have to invest some time. Nothing comes with nothing. The first part is going to be an investment to validate something but then in order to overcome the little gap that you want to fill, you can basically validate your option and step over and keep going.

Mike Merrill:
You literally cloned yourself, is that right?

Alfonso Oliva:
Exactly, exactly but the other version was smarter than me. That's what I found out. And that's why then I kept going with the other version.

Mike Merrill:
I love it. That's great. Well, the other version won't get gray hair either, right.

Alfonso Oliva:
Yes, exactly.

Mike Merrill:
Well, that's awesome. To wrap up, what is one takeaway that you would hope the listeners would have at the end of our conversation today?

Alfonso Oliva:
I think one of the takeaways is that remember … Always remember that at the end of the day, no matter which kind of task you are completing, if it's for work or for a project or for research or anything, we are humans. And we need to respect ourselves for that. Don't stress too much if things are not working because some things are meant not to be working, right, for you to teach something. And keep believing in what you're doing somehow down the path is going to bring you some gain, even research that you consider dead, believe it or not, after three years, you're going to be able to take a little piece of that research and apply it to something that you're doing. At the end of the day, just keep believing in yourself, keep believing in your knowledge and in your ideas. And eventually, they will lead to something down the road.

Mike Merrill:
I love it. Never give up and learn to pivot, is what I'm hearing.

Alfonso Oliva:
Exactly, yes.

Mike Merrill:
Love it. Well, thank you, Alfonso. This has been a treasure for me to spend some time with you today. I really appreciate having you on the podcast.

Alfonso Oliva:
Thank you very much for having me and I'll see you soon.

Mike Merrill:
All right, thank you. And thank you to the guests also, for listening to the Mobile Workforce Podcast today. If you enjoyed the conversation that Alfonso and I had, we ask you to please give us a rating and a review and also share the podcast episode. If you want to learn more about what we're doing here at WORKMAX, you can follow us on LinkedIn at WORKMAX and also on Instagram, @WORKMAX_. And again, we sure appreciate the five star rating and reviews and the sharing of these episodes with your colleagues and friends. We, of course in the end, want to help you not only improve your business but your life.