ceocfointerviews.com

Issue: April 16, 2018

CEOCFO Magazine

Q&A with Ricky Solorzano, CEO and Co-Founder of Allevi developing Desktop 3D Bioprinters enabling Researchers, Universities and Pharmaceutical Companies to Cost Effectively create Tissue, Organs and Medical Devices and accelerate Drug Development

Ricky Solorzano
CEO & Co-Founder

Allevi
www.allevi3d.com

Contact:
Ricky Solorzano
305-742-3311
ricky@allevi3d.com

Interview conducted by:
Lynn Fosse, Senior Editor
CEOCFO Magazine

CEOCFO: ***Mr. Solorzano, what was the concept when you founded Allevi in 2014?***

Mr. Solorzano: I was working for Penn Engineering – Tissue Microfabrication Laboratory at the time and there was an individual there named Jordan Miller. He had built his own 3D printer and he was printing sugar glass to make blood vessels within a 3D gel. He basically wanted to try to figure out a way to make blood vessels so that he could make thicker tissues and he turned to 3D printing to do that. More than anything, he found that he could do this for a very cost effective price. Low and behold, after he did the work with the 3D printer he was able to publish in this amazing journal. He went on to go become a full professor out right. He got a great starter pack; about a million starter package there. I saw that and I said, "What if there were other people interested in having such a device as a tool." At the time desktop 3D printing was also coming of age. There was a thing that was happening in plastics and carbon fiber. Therefore, we begged the question and we noticed that there was a similar analogy that there were no desktop 3D bioprinters or 3D printers for biology. They were very expensive at $100,000 or $200,000, but we said if we could make some that were cost effective, affordable and easy to use, we could possibly start a company. Low and behold we made our first one and we sold it to a lab here at the University of Pennsylvania. Then we built another one and we sold that one to another university. Then we built thirty and we sold all of those in about 6 months.

CEOCFO: ***What is different about a 3D bioprinter as opposed to a standard 3D printer? What needs to be different to accommodate the materials?***

Mr. Solorzano: The concept of 3D printing is the same across the board, which is that you are making a structure, layer by layer. You are able to design something on the computer and then print it out, layer by layer, to achieve your object. The main difference among each 3D printer is usually how you take a material from a liquid to a solid. In other 3D printers they use different methods. Some use what are called filaments, which are basically like spools. They have these spools that feed in to the 3D printer as if it is yarn. What is unique about ours is that we use syringes. We load what are called biomaterials or materials that are friendly to the body or to cells and we take these biomaterials and we mix them with a cell type of interest for a specific tissue. If you want to try printing heart tissue then take a material that is friendly to heart cells, then take some heart cells, mix them together, put them in the syringe and then print those out. We have different ways of making those biomaterials solidify as they come out of the extruder. That is really what is at its core; being able to print and pattern cells in a three dimensional object with the use of biomaterials.

CEOCFO: ***Once someone has created the end product is it used for research? Is it used for implantation? Where does it go once the tissue is created?***
Mr. Solorzano: Today it is only used for research. Most of our users are university academics. We have some users in pharmaceutical companies and medical devices. However, even in those user companies they are still using it for research to try and understand, more than anything, the platform and how it could be useful. One analogy that I have always enjoyed giving is that 3D plastics printers and 3D metal printers were able to create things that they were not able to create before. It brought about a new design freedom. The challenge was though, that engineers did not know why that new design freedom was useful. It took them a few years, but then they began to figure out parts that were valuable enough to go on and be mass produced for planes and trains and even some cars and to be mass produced on3D printers. That is what made the most sense. That is what was the most cost effective. Now, if we come back to the bioprinting industry, the challenge that remains today is that we do not exactly know what some of those parts are for out downstream applications, which in our case would be pharmaceutical companies and medical devices. The two areas where we think it is going to be most prominent is being able to create more accurate tissues and more accurate tests for drugs. Instead of just giving a drug to an animal you could give it to a piece of human tissue that accurately acts like the body does. Or the other avenue is medical devices, where you are printing tissues to implant into individuals, which is of great interest to many people. However, we are not there yet. Therefore, we are working with the early innovators, the early adopters, which are the universities who enjoy creating the knowledge and can capitalize on that. The industry players are looking very cautiously to say which of these new ideas is going to allow us to bring this in to our organization and profit off of them.

"The tantalizing idea here of the platform continues to be on the idea being able to automate complex cell arrangements to be able to create small functional organs. Can you make bones? Can you make heart valves? Can you make tissue patches that help improve the quality of life? Not only is that a big market, but it also helps humanity as a scale for both the improvement of life as well as longevity."- Ricky Solorzano

CEOCFO: ***You have a wide range of different materials. What are some of the difference in what you have available?***
Mr. Solorzano: I think that one of the interesting dynamics that the bioprinting industry has the uniqueness to it verses the other ones is that there is a wide range of tissues. Each tissue has different material properties. They have different properties. They are structured differently. Inherently, the cells themselves also recognize the differences between the materials. Therefore, when you think about, let us say, "Okay, I am going to make a metal piece," you will have maybe three or four or five variances. To be honest, I cannot speak too much to the metal industry, but within the bioprinting industry the body has very different properties, depending upon the tissue. If you are bone you are going to be very, very rigid. If you are a liver you are going to be very, very soft. If you are cartilage you might be somewhere in between. The goal is to add cells into the mixture or after. Therefore, the cells are going to recognize their environment. They are going to behave appropriately. If you put a liver cell on something that is like a piece of bone the liver cell is probably going to say, "I am not supposed to here, so I am actually going to cease existing." Smart, healthy cells do that. They say, "If I am not supposed to be here I probably should not exist." However, if you take a bone cell and you put it within the bone environment then it is going to say, "This feels like home, so I am going to continue growing. I am going to set myself in and I am going to try and perform to the best that I can." That is the response that we want to see. At the heart of 3D bioprinting, it is just simply adding geometry to cells. Instead of taking cells and randomly dispersing them in a dish, which is the way most things are done today, you are taking the cells and you are patterning them in arrangements as to which they are found in the body. That is because the body has geometry. They body has things arranged in a certain orientation. As engineers and designers, the closer that we can get to those patterns and having the cells exist in those patterns, then the closer that we can get to achieving the same performance from the device that we make, as it being like something in the body.

CEOCFO: ***Do your customers know what they want or do you help them figure out what they should be using?***
Mr. Solorzano: It is a little bit of both. Usually, our users are really good at one thing. They are very specified in their field. If you have a series of heart engineers, you would have one guy who studied this protein or one guy who studied a specific aspect of the heart and maybe you have another guy who studies how the heart is related to the blood, they are very specific in focus. At the end of the day they are going to continue to push in that direction. The only thing we say is that instead of studying the heart in the way that you do with cells randomly oriented, you should pattern them and your predictions and your responses are probably going to be much more accurate. Therefore, if we provide to you a cost effective solution that allows your results to be 10x better, then you should switch over and do that.

CEOCFO: ***Would you tell us about the various printers you have available?***
Mr. Solorzano: The printers we have available are catered to different sub groups within our user base or their community. We have three printers available right now. It is basically just like “small, medium and large,” It is more like learn, do research or try to be the best of the best. The small one is for people who want to learn and just want to dabble and understand, maybe a platform made for students. You can even think high schools and universities or undergraduate universities. The second one is to do research, so people who are on a budget, but still want to be able to focus in on discovering new things. Then the last one is to say, if you have an unlimited budget and you want the best of the best and you want to be at the very, very cutting edge, then we have a printer for you as well.

CEOCFO: ***Would you tell us about Allevi being recognized by Red Herring?***
Mr. Solorzano: It was very exciting! It was an honor. I think that the CEO of Red Herring, Alex Vieux is very experienced and wise. One of the best things about being recognized by Red Herring is that you actually get to go to the Red Herring conference in California to hear and listen to Alex. Part of it is to say can we make new industry; can we have a company that grows to make a new industry? He has been alongside the right Silicon Valley area, which at its core, made the silicon industry and the computer industry and the software industry as well; those three industries. He has been among some of the most prominent companies that have done that. He is on the board of Tandem Computer, Kyriba Corp. and Check Point Software Technologies Ltd. He knows Bill Gates. It is about what he has seen and how he has seen those industries grow over time. More importantly for us, as a company, is to say, “What did they need to be able to successfully navigate and strategize to achieve the success of the new industry. I think that is one of the most exciting things for me; it is to go over and listen to him speak on these challenges, speak on the fact that you need a good board of directors, speak on the fact that you have to continuously try and receive more and more data, do not take guesses, speak on the fact that we needed to continue to learn from our users and from our customers.

CEOCFO: ***Are you seeking funding or partnerships?***
Mr. Solorzano: Right now we are in the growth stage. We are looking for pharmaceutical partnerships. We are looking for medical device partnerships. Part of the next challenge of for the industry as a whole is that we have created this platform which we will continue to drive into universities and we continue to seed the industry with new ideas. However, we need to begin to listen to some of the end users in this downstream application, which are the pharmaceutical companies, which are the medical device companies. We want to begin to listen to them and the more that we can do that, the better we will be able to serve them. That is what we are seeking at the moment.

CEOCFO: ***We reach many people in health and technology, as well as the business and investment community. Why is Allevi an import company? Why pay attention?***
Mr. Solorzano: The reason people should pay attention to Allevi is twofold. On one end, from an industry perspective, the pharmaceutical industry as a whole has suffered greatly in the past fifteen years. The struggle to bring new drugs to the market has been so different than it was thirty years ago. There has not been that much novelty in the way that they have tried to figure out new drugs. In doing so, in the staticness of the operation, the difficulty to bring new drugs, the success rate might be around ten percent. These are multibillion dollar initiatives to try to bring the drugs to market, of which only ten percent are successful. From industry and investor perspectives it is to say, if these bioprinting platforms which provide automations, greater accuracy and greater predictive ability can come to raise those numbers of success for the pharmaceutical companies, well that is something quite globally impactful from a dollars perspective. The second thing is that as humans we have always been fascinated by the ability to live longer. That is why, especially within the last one hundred and fifty years, humanity has turned to science to help us understand different avenues to find ways to live longer. I think we first saw that switch in medicine with antibiotics. There was a lot of death just from infection, until being able to tackle them with antibiotics. After that came heart conditions. If you live long enough you get some types of heart conditions. It is still a big problem, but there have been a lot of advancements and treatments to be able to correct heart conditions. Then there is cancer. If you live long enough, low and behold, you will get some sort of cancer, just given the genetic makeup and the repetitions there. Given you can live to the ripe old age of one hundred or so, you may then have organ failure. That is the limiting bottleneck for longevity, where you live long enough for your organs to fail. Therefore, the tantalizing idea here of the platform continues to be on the idea being able to automate complex cell arrangements to be able to create small functional organs. Can you make bones? Can you make heart valves? Can you make tissue patches that help improve the quality of life? Not only is that a big market, but it also helps humanity as a scale for both the improvement of life as well as longevity.