

Albert Manero, PhD

Orlando, Florida



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Learn about Florida Entrepreneur Albert Manero, PhD:

As a non-profit organization and a direct support organization for The University of Central Florida, Limbitless Solutions is dedicated to empowering children in the limb difference community. Through creative, personalized and expressive 3D printed bionic arms, the team, led by Albert Manero II, President and Co-founder, is giving hope and inspiration to children throughout the country. Manero shared the story behind his entrepreneurial journey and how the existence of Limbitless Solutions has generated partnerships, provided educational opportunities for students, developed innovative technology and empowered children to find their voice and restore their confidence.

“I grew up in the Tampa Bay area,” Manero said. “I’ve always been interested in engineering. When it came time to decide on a college, I

chose to study Aerospace Engineering at The University of Central Florida (UCF) for many reasons. They have a great Engineering program and it's affordable. I was conscious about getting an education without taking on a lot of debt."

While at UCF, Manero earned a Bachelor of Science in Aerospace, followed by a Master of Engineering in the same field and a Ph.D. in Mechanical Engineering. He also spent time as a Guest Research Scientist with the German Aerospace Center – awarded as a Fulbright Academic Scholar Grant – and with the Argonne National Laboratory. While pursuing his Ph.D. in late 2013, Manero heard a radio interview that ignited a curious quest to learn more and to be part of, what was considered to be at the time, a new and emerging technology.

"The interview was with a gentleman who built the first 3D-printed mechanical hands," Manero said. "I knew right away I wanted to be part of it. I was determined to find a way to get involved."

What started as a "kitchen table project" quickly evolved into something much more significant. Manero, along with Limbitless Solutions co-founders, John Sparkman and Dominique Courbin, established the non-profit in May 2014 and went to work on designing and creating their first bionic arm.

During this time, a local family caught wind of Manero's pursuits and asked if he could build an arm for their son, Alex. The Limbitless Solutions team accepted the challenge and, eight weeks later, Alex was presented with his new bionic arm.

"We had to figure out how to make something that had never been done

before,” Manero said. “From a technical standpoint, being able to keep the weight low was crucial. We also had to develop the right software, find the right manufacturing equipment and then find all the right pieces to integrate everything together. These pieces – the motors, battery and electronics – are very important components.”

“The Today Show covered the delivery of our first bionic arm, which led to hundreds of emails from other parents,” Manero said. “After that, the floodgates were open.”

A year later, Limbitless Solutions received a celebrity endorsement when Robert Downey Jr. presented Alex with an Iron Man themed bionic arm.

The exposure through Microsoft’s “Collective Project” and the subsequent coverage and stories of the event provided Manero and his team with additional interest and funding. By January 2017, Limbitless Solutions was officially considered a full UCF direct support organization. By 2018, the team announced the start of clinical trials to advance their work and ultimately establish FDA clearance to allow them to produce and distribute as many arms as possible.

“By 2018, we were well on our way to changing the paradigm of cost by using 3D printing,” Manero said. “The market value of a similar prosthetic arm can be over \$50,000. The hardware cost to produce one of our bionic arms is roughly \$1,000. With traditional prosthetics, the financial piece is a real limitation for a lot of families. We’re helping to remove that burden by, not only reducing the cost of production, but also by donating the arms – free of charge – to our families.”

With funding from philanthropists and corporate partners, Limbitless Solutions, as of August 2020, has donated 40 arms and has funding for

current and future clinical trials. They've also provided employment opportunities and internships for graduate and undergraduate students at UCF.

As Manero shared, the funding and unlimited supply of fresh talent has resulted in technological innovations with the bionic arms and the creation of complimentary software products.

"Our hands today are certainly more advanced than they were six years ago," he said. "They can now do multiple gestures and they even have better dexterity. We've equipped the arms with blue tooth technology to connect to a smart phone – which allows you to recalibrate the arm remotely. We worked with UCF professors in visual arts and game design to develop training games and apps that teach kids how to better use their arms. We've even improved the paint. Our full-automotive paint process allows for richer and bolder colors. Working with other brands to put out creative and expressive arms has been so rewarding."

Looking ahead, Manero, who enjoys nothing more than getting positive feedback from happy kids and families, would love to be able to help any child anywhere. With full FDA approval, Limbitless Solutions will be able to distribute their bionic arms and work with insurance companies to cover the cost. Manero is also focused on continuing to strengthen his partnerships with brands like Adobe, Autodesk – a company that develops software to support 3D mechanical design, electronics design and artistic sculpting – and Stratasys, a global leader in applied additive technology solutions used in manufacturing, aerospace, automotive, design and prototyping.

"We want to make an impact on a global level," Manero said. "We also

want to change the conversation from the limb difference being looked at as a defect to prosthetics instead being seen as an extension of that child's expression. We're proud to be among a handful of people around the world working on this and we're excited about the future of Limbitless Solutions."

What advice does Manero have for aspiring entrepreneurs? "When you find that intersection of creativity, inclusion and empathy, it will resonate with others in whatever field you're in. It's very fulfilling to work together and to bring diverse perspectives together to make tomorrow brighter. My hope is that the pandemic won't stop innovation and people from collectively pushing boundaries. We can accomplish so much more together."

Manero added, "Also, in terms of advice, identify a mentor as early as possible. Having contacts in different fields is helpful, but mentors are essential."

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