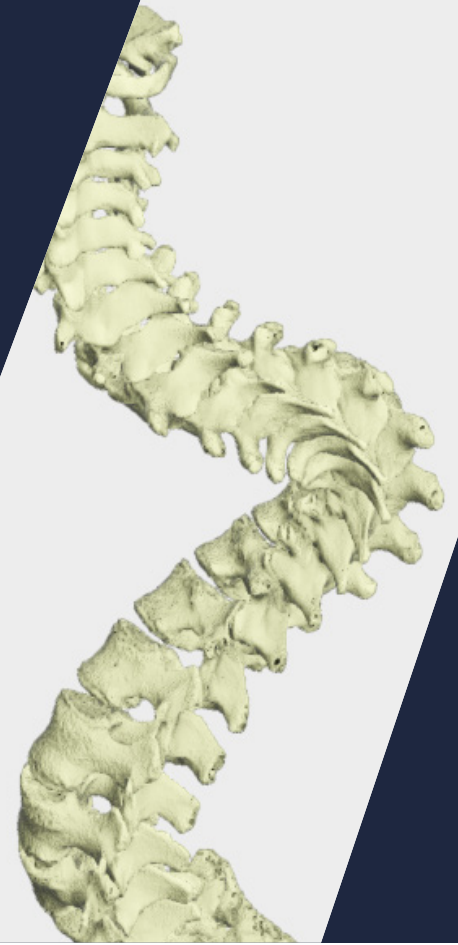


Case Study: Armor Bionics

3D Printed Medical Models Allow
Surgeons to Focus on Patients



Credit: Armor Bionics

Medical models designed by [Armor Bionics](#) and 3D printed by Shapeways have been described as a GPS for the surgeon, paving the way to designing, planning, and *operating*. The models depict the exact anatomy of patients, offering new tools for surgeons to streamline training and procedures. This means they can spend as much time as possible focusing on treatment and surgery, without getting off track and taking on extraneous, and often very complex tasks, like deciphering software or mastering 3D modeling.

The Story of Armor Bionics

The serendipity that brought the Armor Bionics team together initially has always stretched far beyond the basic idea of just doing business. Since 2015, Bruno Demuro and Pablo Pereira have been on a dedicated path to improving the quality of life for patients in need of surgery around the world. The Uruguay-based company originally centered around, and was named after, their intention to produce not only bionic products related to health and technology, but also prosthetics. It was not long, however, before they branched out into making complex 3D printed medical models.



Dr. Alejandro Cúneo (left) & Pablo Pereira

Credit: Armor Bionics

Bruno Demuro and Pablo Pereira have been on a dedicated path to improving the quality of life for patients in need of surgery.

Co-founder and CEO Bruno Demuro’s entrepreneurial spirit is complemented by his degree in Industrial Design, along with ongoing interests in engineering and medicine. After his mother underwent surgery for breast cancer, he became passionate about finding better ways for surgeons to plan, train, and operate. At the time, Demuro was shocked to see that although his mother’s tumor was only about the size of a penny, the surgeon made an exponentially larger incision—explaining that the alarming expense was required to attain a more comprehensive field of vision. That did not sit well with Demuro, who was determined after that to go to great lengths in helping surgeons refine the process, and to make recovery easier for patients in the future.

As the idea for Armor Bionics was forming in his mind, Demuro happened to meet with Pablo

Pereira—an old friend from college—and soon to become the other co-founder and COO of the new company. Demuro and Pereira bonded again not only over their admiration for the strides being made through 3D printing, but also within the medical industry.

“At that point, I was finishing up my first MBA related to startups and technology companies,” said Pereira, who already had a degree in engineering. “We sat and had coffee and within two hours we had a roadmap for making 3D printed models available to hospitals.”

“We started working on that and presenting our ideas at many events, getting closer to patients and surgeons and really understanding what they needed.”

Demuro and Pereira focused on presenting doctors and hospitals with greater opportunity for

The partnership with Shapeways allows Armor Bionics to offer a high level of accuracy that surgeons have come to trust and rely on to help with their intricate surgeries.



Bone structure of the hands

Credit: Armor Bionics

patient-specific treatment. The government of Uruguay presented them with a grant designed specifically for projects meant to help people, allowing Armor Bionics to begin working with underfunded, smaller clinics too.

Armor Bionics Focuses on 3D Design and Delegates the Manufacturing to Shapeways

Moving forward, the evolution of Armor Bionics into providing medical models for surgeons was intuitive and rapid. The budding company gained the respect of doctors and patients quickly. They were asked to participate in important cases and began winning awards in the industry too.

Since the inception of the Armor Bionics, the greatest lesson the team has learned is to listen to what everybody involved needs. Along with fully understanding the requirements of surgeons and the needs of the patients

in surgery, Demuro and Pereira have continued to empower them further by adding an important tool to their surgeries: a one-stop, 3D printed surgical solution. This is what sets their company apart from others, with the ability to offer hospitals and small clinics a groundbreaking way to truly streamline medical procedures.

“This is not something that is easy to do,” said Demuro. “We stick to our strengths, and we are specialized in 3D design, understanding what doctors need, giving that to them, and using 3D printing to empower their work.”

Demuro and Pereira realized that their expertise was in design, not manufacturing, and it was time to delegate that work to Shapeways. Any worries were quickly dispelled as the first 3D print from Shapeways was a ‘perfect’ representation of what they requested, printed in [Nylon 12](#) [Versatile Plastic] using Selective Laser Sintering



Bruno Demuro (left) and Pablo Pereira, founders of Armor Bionics

Credit: Armor Bionics

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The models can be iterated as many times as necessary, until the 3D model shows the doctors exactly what they want to see for the surgery.”

– Bruno Demuro
Co-founder and CEO, Armor Bionics



Dr. Alejandro Cúneo
planning for surgery

Credit: Armor Bionics

(SLS). As all parties involved have continued to focus on their strengths, the relationship has only continued to point toward bigger and better advancements, with Armor Bionics focusing on 3D modeling, Shapeways focusing on 3D printing, and the surgeons focusing on *performing surgery*.

While Shapeways already has extensive experience in offering accuracy, repeatability, and scalability to customers around the world, the potential for doing that within hospitals everywhere too is immense.

Demuro reports that surgeons have repeatedly told them how many hours are saved due to the pre-planning available. As a result, associated hospitals are noticing the new level of efficiency too—led by the anatomical accuracy in the 3D models printed by Shapeways. While doctors and hospitals have more access to 3D printing technology than ever before, Armor Bionics is unique because of the meticulous accuracy they offer in their 3D designs, and their choice to partner with Shapeways and its industrial manufacturing services. The partnership allows Armor Bionics to offer a high level of accuracy that surgeons have come to trust and rely on to help with their intricate surgeries.

3D Printed Medical Models Manufactured and Shipped Globally from Shapeways Factories

The 3D models extend beyond any language barrier as well, putting everyone on common ground. Both Demuro and Pereira greatly appreciate the way medical professionals from different facilities are able to come together in complex surgeries, all able to refer to and depend on the photorealistic models for guidance during diagnosis, treatment, and surgery.

The surgery to separate conjoined twins in Peru serves as an inspiring example, as five surgical teams worked together, using the Armor Bionics 3D printed model as their main asset for information. The procedure was a great success, involving 17 hours in the operating room, with 40 doctors participating.

“We give them exactly what it is that they want,” said Demuro. “The models can be iterated as many times as necessary, until the 3D model shows the doctors exactly what they want to see for the surgery.”

The process begins as Armor Bionics explains what they need from the customer, beginning



Working with Shapeways just made sense. Surgeons are now able to receive 3D printed models anywhere in the US, extremely fast.”

– Pablo Pereira
Co-founder and COO, Armor Bionics

with images that can be sent over directly online. The Armor Bionics team designs the model according to all specifics outlined by the customer, which in some cases are quite complex. Once the model has been cleared and is ready for production, it is sent to Shapeways for manufacturing.

“All doctors can benefit from this modern new turn in treatment,” said Demuro. “We’ve seen the advantages in how this technology impacts the patients, and how it betters the outcomes of every single surgery where it is applied.”

Requests for Armor’s work come from all over the world—South America, North America, Europe,

and beyond – and this was another one of the big reasons they chose to work with Shapeways, so they have the ability to create models and have Shapeways ship the printed parts globally.

“Working with Shapeways just made sense,” said Pereira. “One of the biggest barriers we had in terms of getting into the US market was that we had no reliable place to 3D print the models. Sending them all the way from Uruguay to the United States was very hard to do. By partnering with Shapeways, surgeons are now able to receive 3D printed models anywhere in the US, extremely fast.”



Bruno Demuro is the Founder and CEO of Armor Bionics, a company specialized in patient-specific 3D printable models for surgical planning in the healthcare industry.



Pablo Pereira is the Co-Founder and COO of Armor Bionics. Pablo’s ongoing mission is to enhance surgeons’ skills by developing and applying new forefront technologies with innovative business models.

Pablo and Bruno’s journeys are featured in the film [Outside the Valley](#).

About Shapeways

Shapeways makes world-class 3D printing more accessible to everyone through automation, innovation and digitization. Our purpose-built software, wide selection of materials and technologies, and global supply chain lower manufacturing barriers and speed delivery of quality products. Shapeways' digital manufacturing services have empowered more than one million customers worldwide to produce more than 21 million parts using 10 different technologies and 90 different materials and finishes. Headquartered in New York City, Shapeways has ISO 9001-compliant manufacturing facilities in Long Island City, N.Y., and Eindhoven, the Netherlands. Contact us at www.shapeways.com to learn more.