Every year in the United States approximately 100,000 legs are lost due to cancer, vascular disorder, diabetes and accidents. Prosthetic limbs have been around dating back to the ancient Greeks and Romans. Over the years, prosthetics have come so far in terms of appearance, structure, and comfort. However, prosthetic limbs still remain quite expensive. With the advancement of being able to 3D print these limbs, engineers are hoping for a more efficient and less expensive way to create prosthetic limbs. In the past prosthetic limbs were made from various materials, wood, iron, metal, etc. Then came the prosthetics made from more advanced plastics and carbon fiber, which allowed for a lighter makeup of the prosthetic, as well as a stronger structure. Today engineers are scanning the intact limb, using systems such as FastSCAN by Polhemus and Handyscan 3D by Handyscan, in order to match the symmetry of the person’s body. Not only can engineers measure the dimensions, these engineers can scan the surface area and the residual limb (the stump which was left after amputation). Being able to scan the surface of the intact limb allows for the possibility to have a prosthetic limb, which essentially mirrors the sound limb, or giving the patient the option to personalize the limb in anyway desired. The ability to scan the residual limb allows for a more comfortable socket to be designed, and a perfect fit of the prosthetic onto the residual limb. Originally the socket was created by the prosthesis taking a mold of the residual limb, which serves as a template for the prosthetic limb. This is not perfectly accurate. Being able to scan the residual limb allows for a better measurement.

This picture shows a prosthetic limb, which was designed through this 3D process. As you can see the appearance looks almost life like.

References: