

The future depends on

Humans: the robots of the future

ISABELLE HO

The world is no stranger to prosthetic limbs, with waves of amputees from the world wars, Afghanistan and Iraq as well as illnesses and accidents. However, until the late 20th century, prosthetics were largely mechanical, heavy and uncomfortable. These limbs, powered by pulleys and strings, were difficult to hide inside models of realistic hands – once desired because of the stigma surrounding prostheses – without compromising their functionality. Prosthetic wearers would have to make a choice between looks and functionality.

Since the dawn of the computer age, prosthetic limbs no longer have to be powered by the body. They come complete with battery packs and microprocessors, and can be much lighter thanks to smaller electronics. One of the most revolutionary developments was the myoelectric control system. No longer did wearers have to bend their forearm to open their hand, now, electrical impulses from the nerves which would naturally control your muscles ('myo' means muscle in Greek) could be picked up by a sensor. Different impulses would translate into specific movements performed by the bionic limb. This was and is still ground-breaking technology: what once used to be a static hook is now an engineered hand with fingers individually moving on command.

Although the stigma of disability has by no means disappeared, there is a move towards producing prosthetics that can be worn openly with pride. Open Bionics is one such company. Their designs range from slick and simple to Disney-themed. Drawing on popular culture such as Iron Man or Star Wars to make prosthetics is not only cooler, but something you'd want to have. For children (and probably a lot of adults too) a bionic arm is no longer something to hide, but something that brings their imagination to life!

High-performance prosthetics have always come with high price tags, but now 3D printing has become much cheaper and more accessible. Combined with the speed of machine learning, manufacturing a prosthetic limb is no longer slow and artisanal. Personalised limbs can be made with speed – even from home with a 3D printer – which means designs can develop and improve quickly. Since the first 3D printed bladder was made in 1999, scientists have successfully managed to print functioning heart and lung tissues. In the future, patients would never have to be on an organ donor waiting list again, nor need immunosuppressants as the implants will be grown from their own body. The foundations of this technology have already been laid, and the idea of your own 3D printed leg is more than just a mere possibility.

There's an abundance of hope in the future of robotic limbs. For example, ultrasound technology currently outperforms myoelectric sensors which could provide even faster and precise limb control. There is still work to be done to increase limb functionality. Articulation, the ability to move individual joints, is limited, and limbs are not yet able to include the full sensory experience such as feeling differences in pressure or temperature. But nevertheless Hugh Herr, an MIT engineer who developed his own bionic legs, said in an interview, "I think in two to three decades we will have bionic limbs that completely emulate biological function." When – not if – technology reaches a point where robotic limbs can be an aid to the human body, exoskeletons could extend human performance beyond the average ability. This might be an exoskeleton to improve mobility in old age, or to reduce the strain on joints of runners. Could humans, aided by technology run faster, jump higher, reverse the effects of old age, and consequently fast forward evolution?

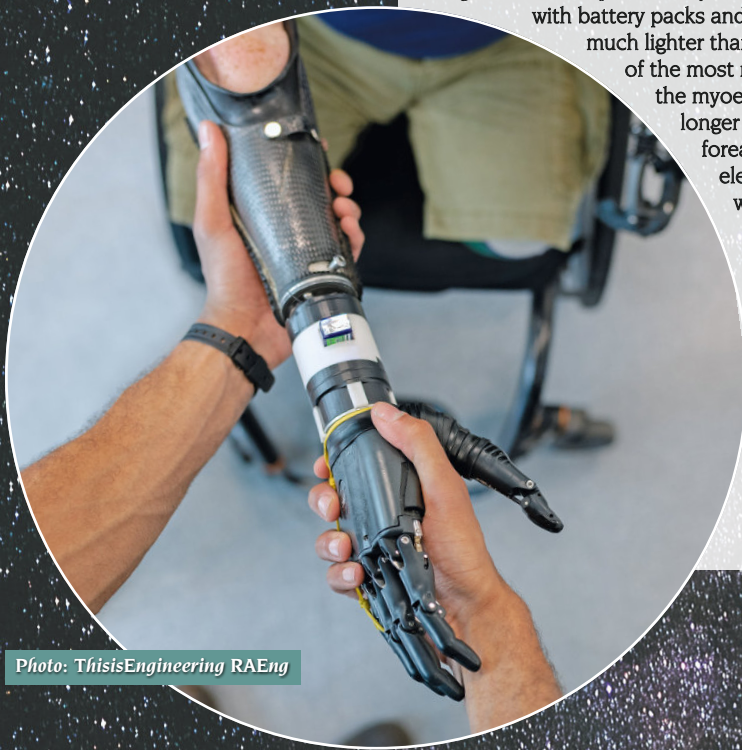


Photo: ThisisEngineering RAEng

Taking small steps into the future

MADHU KANNON

Someone once said that the best way to plan for the future is by planting seeds. I thought about this quote one morning when tending to my plants. I have realised that I spend far too much time in the future and never stop to smell the roses that I have spent so long watering. Planning and looking into the future is always a daunting prospect for me when sometimes I don't even know what I'm going to eat for dinner that night!

Pausing and reflecting on what I really want from the future has helped me navigate the uncertainty and feeling out of control. Doing small tasks that make me happy and help me enjoy the present have helped me feel more positive about the future. I love baking bread, the delicious smell that slowly wafts through my kitchen fills me with an instant joy and a verve for life. Or crocheting, deliberately creating each stitch and delicately sewing each individual piece to create intricate and beautiful cardigans, fills me with purpose and pride. When I dedicate time to projects I care about, whether it be hours or days, watching the final result grow slowly and purposefully to fruition, makes me feel that all my hard work has been worth it.

Sometimes the only way that we can look into the future is by stopping and reflecting on the past. The last two years have been a time where we have all changed and altered ourselves in small ways. There is nothing wrong with change as it shows growth, no two trees grow back the same after each season. Spending time on yourself, taking small steps into the future is the only way we can move into it, without it feeling like it's a stab in the dark.

So plant your seeds and water them well, fill your life with all the people and things that you love the most and most importantly remember that you are not the only one struggling to plan beyond tomorrow.



Photo: Cassidy Phillips