# Augmented humans

Bionics, wearable technologies, augmented reality applications, and performance and memory enhancements could allow people to move, think, see, feel and hear with incredible speed and precision. The barriers that separate the physical world from the digital one will increasingly melt away. And technologically advanced exoskeletons, eyewear and implants could allow people to work longer, retire an older age, lift more and interact with colleagues and data in new ways.

Everything from the plough to the PC has radically altered the way we work, learn and communicate. But the latest wave of emerging technologies promises to expand human capability in ways that take us well beyond the natural limits of our minds and bodies.

Currently, the medical and rehabilitation sectors (along with defence) are at the cutting edge of advanced augmented technologies. However, we are already beginning to see the impact of new forms of augmentation upon construction, education, elderly care, fashion and other industries as well. Augmentation will have profound effects on human behaviour – even our understanding of what it means to be human. This begs the question of what the new normal of the human condition will be. Organisations such as The Royal Society have expressed concerns of the abuse of enhancing technologies; for instance, could employers tacitly demand that employees 'augment' themselves with stimulants such as Aderall? [1]

Another question is whether we really want the 'superhuman' capacities they offer. Is it desirable – for individuals and for society as a whole – for the vast majority of us to work longer and harder and learn faster in the next 15 years? How might we ensure that augmented capabilities lead to a better quality of life for us all? Can access to augmentation and its benefits be fairly distributed?

Last updated: 30 November 2015

Footnotes:

1. The Royal Society (2012, Nov). Human enhancement and the future of work

## Implications

- Enhanced human capability and capacity could lead to unprecedented improvements to the quality of human life. Exoskeleton systems like ReWalk and the Esko Bionics suit could help millions of people with spinal cord injuries to walk again, as well as stroke victims and those with muscular dystrophy and other genetic conditions. They could also allow elderly people to remain active and independent for longer, and grant construction workers, sportspeople and military personnel extra strength and stamina. However, these same technologies could also create new categories of 'haves' and 'have nots' – the ReWalk, for example, costs just under US$70,000.
- Some enhancements could redefine what it means to be human – which is one of the goals of the Transhumanism movement – and lead to profound cultural, ethical, philosophical and economic shifts. In the long term, society may begin to split along 'augmented' and 'non-augmented' lines, for example, with some people rejecting the augmentations that others embrace. Genetic and synthetic enhancements could also extend average life spans by decades or more for those who can afford them, and human consciousness may increasingly merge with machines. But a backlash against

human augmentation and increased regulation of emerging industries could limit some areas of research and its potential application.
- As technology becomes embedded in human bodies, the rights over the devices, the cost to obtain devices, the freedom to adapt them, and the ownership of the data generated by them, becomes more acute. [1]
- Augmentation of senses could open up profound new ways to interact with one another and the world opening up new frontiers for experience, creativity and relationships. We might choose to be able to hear colours for example, which is an ability that people with the neurological condition, synaesthesia have.

Footnotes:

1. Cyborg Foundation (2015, May). The cyborg we are becoming

## Current trajectory

- Gene editing: Lawmakers in the British parliament voted on 3 February 2015 to become the first country to allow a "three-parent" IVF technique which doctors say will prevent some inherited incurable diseases but which critics see as a step towards creating designer babies. [1]
- Nanotechnology: Self-propelling nanobots delivered drugs to a specific location in an animal for the first time, covered in a journal article in January 2015. The micro-robots are made from zinc and are propelled by a reaction with stomach acid. [2]
- Life-extension technologies:There are various drugs and other techniques to slow or eliminate the aging process. Google's Calico project aims to 'cure death', for example. [3]

Footnotes:

1. Reuters. (2015, Feb). Britain votes to allow world's first 'three-parent' IVF babies
2. ACS Nano Journal (2015). Artificial micro-motors in the mouse's stomach
3. Science-wise (2015, April). Public attitudes to human enhancement