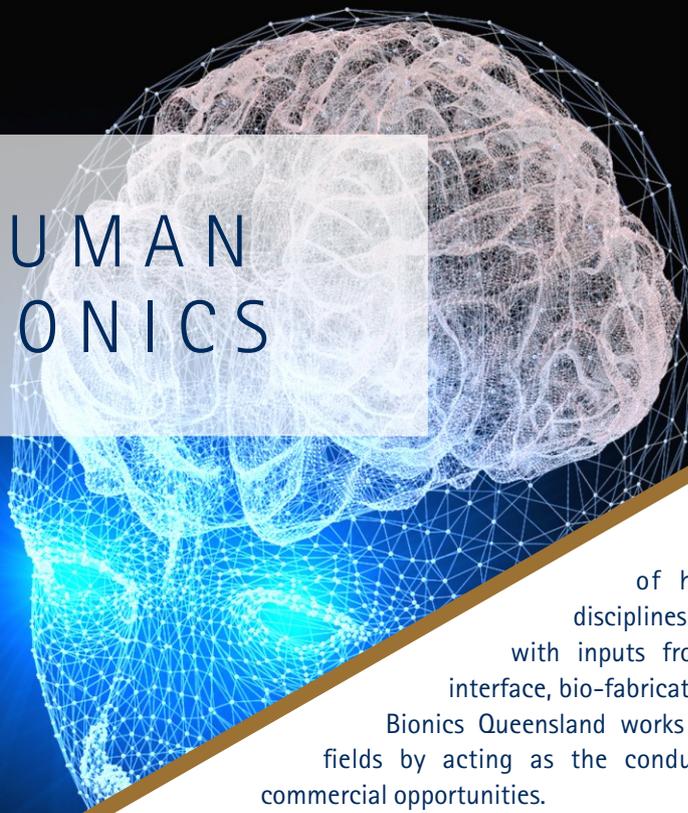


HUMAN BIONICS



Bionics Queensland is a Brisbane-based cluster working to advance research and commercial endeavours across the broad spectrum of human bionics. The spectrum of disciplines driving bionics breakthroughs is broad, with inputs from neuroscience, the brain-computer interface, bio-fabrication, robotics and materials engineering. Bionics Queensland works at the intersections of these diverse fields by acting as the conduit to identify synergies and unlock commercial opportunities.

An ambitious long-term vision

Bionics Queensland, incorporated in 2018, has an ambitious long-term vision, and an expert STEM board of Directors representing Brisbane's fast-growing competitive bionics sectors.

With a strong suite of partnerships and a measured and realistic strategy to deliver results for the Greater Brisbane economy, the expectation is to increase global market share over the next decade. With a current estimated value of \$US10.53 billion globally, the bionics market is expected to reach \$US21.37 billion by 2021 with especially high growth in the Indo-Asia Pacific regions.

Brisbane is very well-placed to capture market growth and this alliance hopes to expand across Australia to deliver a much wider suite

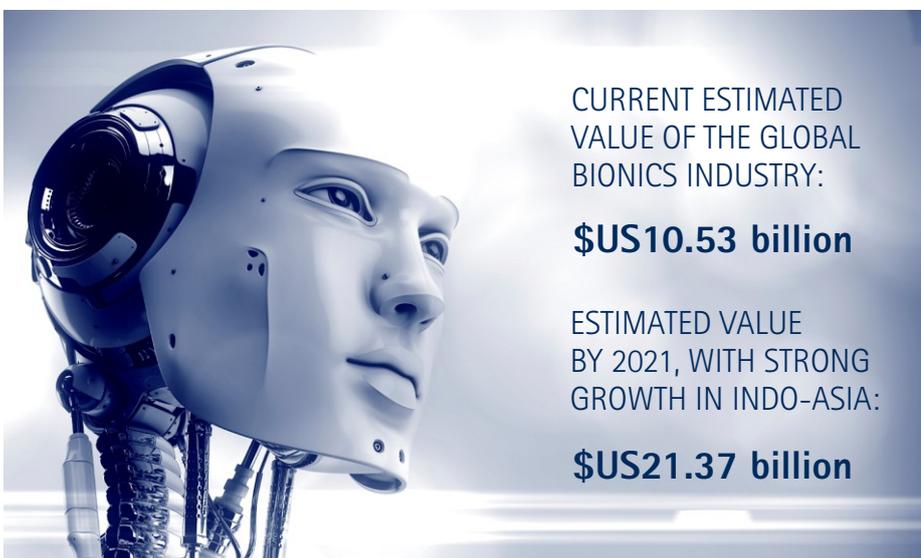
of new and enhanced bionics solutions, opportunities for commercialisation and advocating collectively for government and private sector funds, capitalising on shared and distinctive scientific and commercial expertise.

Driven by the fundamental desire to deliver bionics solutions more quickly to those with disabilities, Bionics Queensland has established a common network and platform for bionics scientists, engineers, financiers, government and entrepreneurs to share ideas, unlock opportunities, tackle the challenges, and deliver devices and treatments faster.

A new action plan for bionics industry development in Queensland will underpin new and emerging medtech devices, artificial organs and limbs, medical wearables and customised healthcare services.

Exponential technologies such as machine learning, artificial and augmented reality, quantum computing and bio-fabrication will converge with human learning, advanced engineering, neuroscience, brain mapping and robotics to define and integrate the future of bionics healthcare.

Established by Dr Dimity Dornan AO, Bionics Queensland will take scientific, industrial, humanitarian and collaborative success of bionics devices to new heights.



CURRENT ESTIMATED
VALUE OF THE GLOBAL
BIONICS INDUSTRY:

\$US10.53 billion

ESTIMATED VALUE
BY 2021, WITH STRONG
GROWTH IN INDO-ASIA:

\$US21.37 billion

WHAT DOES HUMAN BIONICS INCLUDE?

- Bionic eyes & ears
- Spinal cord repair
- Treatment of depression, stroke, anxiety and Parkinson's
- Drug delivery
- Intelligent prosthetic limbs
- Artificial muscles and tendons
- Nerve repair
- Bioactive arterial stents
- Cardiac assist / artificial hearts
- Implantable sensors / diagnostics
- Artificial organs
- Neural interfaces
- Pain treatment

New Developments and Case Studies



HUMAN BIONICS INTERFACE

Bionics Queensland is also home to the Human Bionics Interface (HBI) alliance, a global group developed to unlock the major healthcare opportunities and the challenges facing the human bionics sector. HBI will co-ordinate, facilitate and accelerate Australia's role in delivering personalised human bionics solutions and customised healthcare services globally.

The HBI alliance will strive to give health consumers early access to breakthroughs in bionic vision, hearing, the bionic heart and brain, artificial limbs and organs, and medical wearables that interface with the brain.

Digital and real-world collaborative platforms will connect and energise projects, resources and people across all fields of bionics to deliver ground-breaking solutions. The rewards for collaborating through the HBI alliance will accelerate the development of previously unimagined outcomes.

COCHLEAR EXPANDS ITS BRISBANE MANUFACTURING OPERATION

Bionic ear implant maker Cochlear is expanding its manufacturing base in Brisbane and is currently at the final phase of redeveloping its Newstead site, where the company has 200 employees.

Cochlear has invested more than \$15 million in capital, plant, equipment and labour to enable the Newstead facility to manufacture the latest electronic components used in their implants.

This is in addition to products and components used in the external parts of the cochlear implant system like sound processors. Cochlear is the perfect example of Australian-headquartered, globally-competitive exporters choosing Queensland to base their manufacturing operations.

The Cochlear facility's official opening in 2018 with Queensland Minister for Health Cameron Dick (left) and a Hear and Say family.



INDUSTRY CASE STUDY: MICROTIA

Approximately one in 5000 babies are born worldwide with a malformation of the outer ear, a condition known as microtia. Children with this condition may experience severe emotional and psychosocial distress without intervention.

Currently, microtia is treated via surgical reconstruction using autografted rib cartilage, surgical implantation of an alloplastic device, or the use of a personalised silicone prosthesis.

The FutureHear project is a collaboration between QUT and Hear and Say using bio-fabrication to create an external ear to enable a child with microtia to look like their peers. The eventual goal is to connect the ear to the hearing system via an implanted hearing device. www.research.qut.edu.au/biofabrication