



**UNSW**  
Tyree Foundation  
Institute of Health  
Engineering



# Vision 2030

A hub of excellence in MedTech  
innovation with global connections

## **Our Vision**

To drive global healthcare innovation and societal impact by bridging unmet health needs with medical technology solutions.

# It is with great enthusiasm that we present to you the 2030 Vision of the Tyree Foundation Institute of Health Engineering (Tyree IHealthE).

Our vision is purposeful – To drive global healthcare innovation and societal impact by bridging unmet health needs with medical technology solutions.

Medical technology (MedTech) has the power to change lives for the better by making quality healthcare more accessible and affordable to all. As the Directors of Tyree IHealthE, we are honoured to lead a team that is committed to this vision, and to excellence and relevance in all aspects of our work.

Our focus is on helping MedTech innovators bridge the gap between unmet needs and ground-breaking technology. We do this by providing a supported framework that enables them to:



explore those unmet needs with healthcare providers and consumers



develop pioneering solutions powered by modern technology



meet all the necessary regulatory, legal and logistical requirements



ultimately, deliver feasible, financially viable MedTech innovations that have the power to transform the health and wellness landscape

We are committed to the principles of co-design and collaboration, driven by the belief that innovation thrives when diverse perspectives and expertise come together. We cultivate networks of healthcare professionals, consumers, technologists and business leaders to help guide the work of MedTech innovators and accelerate their journey towards successful outcomes. And we provide ongoing opportunities for our members, stakeholders and the broader community to acquire the knowledge, skills and mindset they need to be successful innovators and embed an innovation culture in the workforce of the future.

Thanks to the generous \$10 million donation from the Sir William Tyree Foundation and support from the Faculty of Engineering and Faculty of Medicine and Health, we have already made significant progress towards our 2030 goals. We invite you to be part of this ongoing journey as we strive to make a meaningful difference in the field of healthcare innovation.

**Nigel Lovell and Laura Poole-Warren**

Co-Directors



# Our People

## Accountability

**Clinically led, the Steering Committee has wide-ranging expertise across clinical, technological and business areas.**

Our Steering Committee encompasses clinical, technological and business expertise, and ensures that goals are met, and that all clinical, ethical and regulatory requirements are addressed.

## Leadership

**Executive leadership team with deep expertise.**

An Executive Team with the experience, expertise and professional networks to lead day-to-day operations and deliver on the Tyree IHealthE vision.

## Advisory

**Industry led, the Knowledge Translation Advisory Committee, (KTAC) encompass experts across key commercial domains.**

The Knowledge Translation Advisory Committee advises the Executive Team on how to ensure that research projects progress to implementation and impact

## Vision

**To drive global healthcare innovation and societal impact by bridging unmet health needs with medical technology solutions.**

## Education

**Expertise in developing and delivering educational programs and initiatives aligned with Tyree IHealthE's vision.**

- > Course development and administration
- > Training and delivery
- > Fellowship & scholarships
- > Research supervision and support

## Translation

**Multi-disciplinary team to catalyse and facilitate innovation translation.**

- > Business strategy and commercialisation
- > IP and regulatory strategy
- > Funding applications/pitches
- > Facilitation and connection
- > Deep MedTech expertise



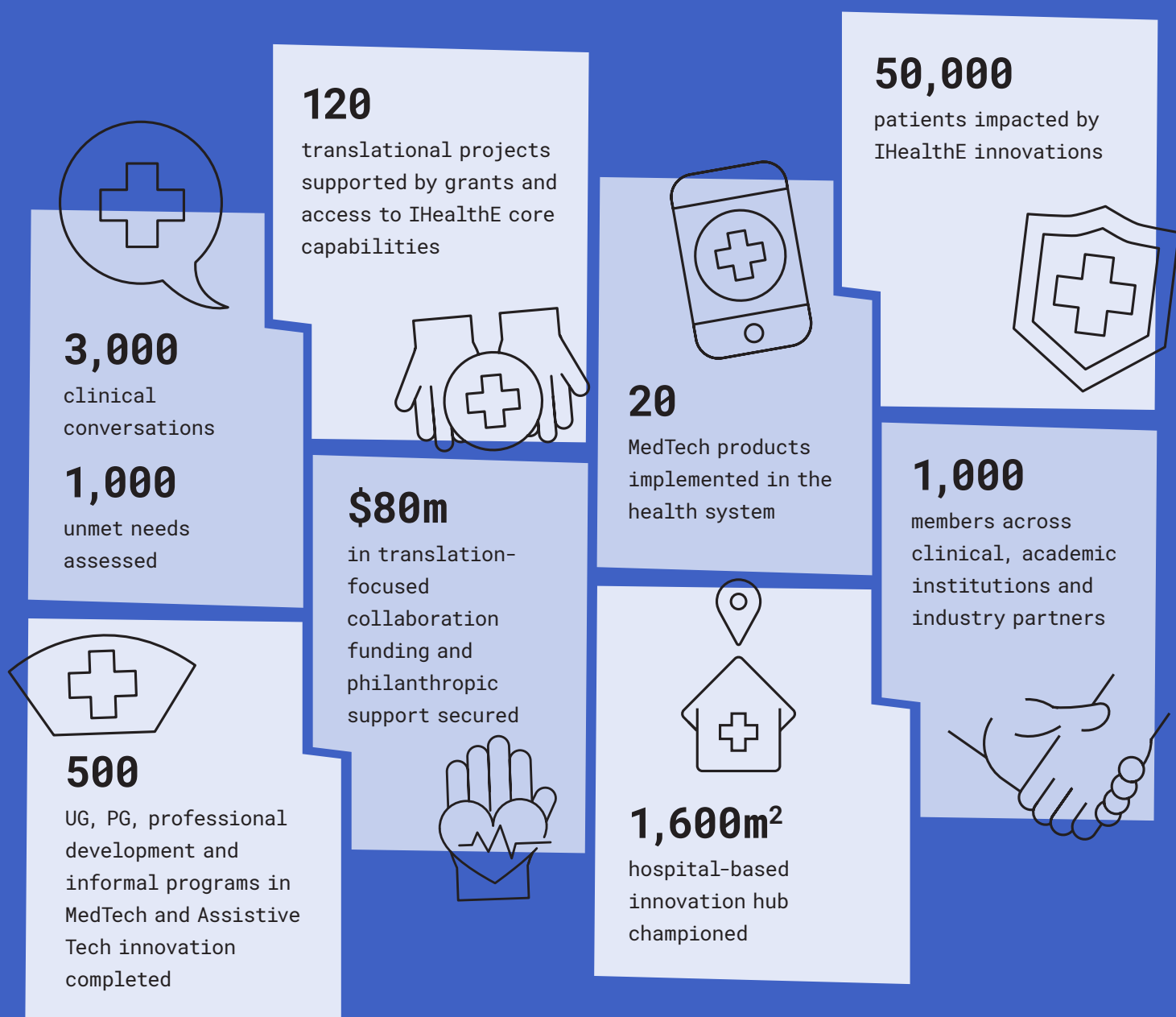
# 2030 Goals

Tyree IHealthE is now well established as an interdisciplinary hub of healthcare translation. Informed by our values, and with a focus on translation and education, we are helping to embed an innovation culture across the University.

By 2030 we will be co-located in the Randwick Health & Innovation Precinct (RHIP) with strong connections into MedTech innovation groups nationally and internationally.

This will support the growth of our future workforce, and channel the knowledge gains of the research sector into better health outcomes, and broad-based economic and social benefits.

We have set ambitious goals for ourselves – but already we are on target to deliver these outcomes by 2030.





# Our Values

The work of Tyree IHealthE is underpinned by our steadfast commitment to **five** core values.



## Embedding principles of co-design

Our design process is fundamentally informed by the integration of clinical, engineering, bioscience, commercial, consumer, and user expertise. Bringing together diverse perspectives and a strong evidence base helps us develop solutions that are comprehensive, effective, and tailored to the needs of all stakeholders.



## Empowering future MedTech innovators

Through immersive programs, mentorship, and practical experiences, we help talented and ambitious individuals thrive as MedTech innovators.



## Nurturing and promoting diversity

Fairness, equity of access, and transparency are critical components of a thriving MedTech sector. We actively promote an environment where every voice is heard. By nurturing and supporting a broad range of perspectives and ideas, we can develop solutions that are more inclusive, more sustainable, affordable, relevant and robust.



## Exploiting the power of teamwork and collaboration

By building strong teams that make the most of each individual's strengths and expertise, we are able to tackle complex challenges more effectively, and drive innovation forward. We actively pursue external collaborations to leverage resources, knowledge, and perspectives.



## Creating positive societal impact through innovation

We can improve the lives of individuals and help build a better future for all through the development of new MedTech solutions and the creation of vibrant Australian-grown enterprises.



# Our Distinctiveness

**Five** unique and distinctive elements define the Tyree IHealthE approach to fostering innovation in MedTech.



## 1. Needs-driven approach

We firmly believe that MedTech innovation should be needs-driven rather than technology-driven. Our emphasis is on addressing the most relevant unmet needs within the healthcare industry, and ensuring the solutions developed are sustainable and impactful. Growing and leveraging our extensive clinical network enables us to find and validate these needs, and focus on those with the highest potential for translation.

## 2. Health and technology excellence

Through our co-location in hospital precincts, we give innovators direct access to clinical and technology development environments, enabling a much deeper understanding of clinical needs and the clinical context, and driving rapid development of technology solutions. Our commitment to co-design is underpinned by our built-in engagement with consumers, patients, healthcare professionals, healthcare administrators and technologists.

## 3. Cultivating an innovation mindset

We aim to embed a culture of innovation in the workforce of the future. We actively look for opportunities to offer our expertise into other educational programs in the form of seminars, mentoring and short courses with the aim of equipping individuals with the necessary knowledge, skills, and mindset to thrive in the world of MedTech innovation.

## 4. Business and commercialisation expertise

By asking key commercial and translational questions during the early stages of MedTech innovation projects, we help to establish strong translational foundations. We follow this up by supporting innovators along the translation pathway, facilitating access to the most appropriate clinical, technological, and commercialisation expertise.

## 5. Collaboration not duplication

We are continuously working to cultivate an interconnected ecosystem to support Tyree IHealthE innovators. We connect with other world-class MedTech technologists and innovators as well as our partners across UNSW platforms, to assess what programs and platforms exist, and consider how we can collaborate rather than duplicate efforts.

# Education: Supporting Future MedTech Innovators

We're fostering a generation of entrepreneurial thinkers, skilled in identifying unmet needs, collaborating across disciplines, and developing solutions that are fit-for-purpose and commercially viable.

Our educational initiatives are embedding an innovation culture in the workforce of the future, speeding the translation of research discoveries into products and services that improve the lives of patients, and strengthening the development of MedTech and AssistiveTech sectors that will make a significant contribution to the Australian economy.



## What we're delivering

### > **Student research projects**

To date, the Tyree IHealthE team has directly supported more than 25 student research projects, including PhDs, Engineering Honours, and Individual Learning Plan projects.

### > **Community outreach and education**

Tyree IHealthE devotes time and resources to the cultivation of a community interested in working together to identify the unmet needs of the Australian health system, and to meet those needs with technology-driven solutions. We have over 150 members, have held 22 public events, almost 1000 community members on our subscription list.

### > **Long-term, multidisciplinary projects**

Undergraduate and postgraduate students have also been engaged in a number of Vertically Integrated Projects (VIPs): ambitious, long-term, multidisciplinary projects led by UNSW researchers.

### > **Undergraduate and Postgraduate HealthTech Innovation courses**

Tyree IHealthE has also developed a suite of courses in HealthTech Innovation. Undergraduate courses will commence in 2024, with students having the opportunity to immerse themselves in clinical settings, and then return to the classroom to report back on the unmet needs identified, and workshop collaborative solutions. Postgraduate courses will be delivered in the same way with all focus on the development of implementation plans to convert design concepts into marketable products. Courses will cover topics including strategies for addressing regulatory requirements, intellectual property and reimbursement.

### > **Clinical Co-Design Hub projects**

UNSW facilities in the Randwick Health & Innovation Precinct will see educational opportunities multiply. Plans are being developed for undergraduates and postgraduates to contribute to the work of the proposed Clinical Co-Design Hubs.





## Our current capabilities

### > Educational development

Expertise in the development of education programs for a multidisciplinary audience, building capacity for research translation and technology-based solution design.

### > Educational delivery

Expertise in delivering high-quality education using evidence-based methods for best learning outcomes.

### > Rehabilitation engineering

Expertise in educating the next generation of engineers to co-design and prototype assistive technology solutions for people with disability.

### > Health Technology Innovation

Expertise in building university students' ability to innovate and translate health solutions.



## Our capabilities in development

### > Surgical planning

Future expertise in training surgeons to plan surgeries through patient-specific models that are anatomically accurate.

### > Virtual and augmented realities

Future expertise in training clinical professionals to use VR and AR seamlessly within their clinical practice to improve patient outcomes.



# Translation: The Journey from Unmet Need to MedTech Solution

The landscape of modern medical technologies has evolved significantly, encompassing a wide spectrum of innovations.

These include not only medical instruments and apparatus, but also biological products, drug-device combinations, sophisticated software-based medical devices, data-driven systems, and integrated combinations of these elements.

There is also a growing imperative for medical technology solutions to meet patient and consumer needs in an increasingly personalised manner, at the point-of-care and in real time. Tyree IHealthE works across a broad and expanding range of clinical areas to identify unmet needs. We provide expertise and support along the innovation pathway from need to solution.



## What we're delivering

### > **Adapting successful MedTech to serve other needs**

The Bionic array Directed Gene Electrottransfer (BaDGE ®) is a MedTech platform initiated by Bionics and Bio-robotics Medical Lead, Professor Gary Housley. BaDGE was originally developed to regenerate the hearing nerves in patients receiving cochlear implants. It is now in pre-clinical development for the treatment of epilepsy, Parkinson's Disease and macular degeneration.

### > **A new approach to sleep apnoea support**

A multidisciplinary team led by Professor Lynne Bilston is working on a new approach to sleep apnoea support. Called 'Optosleep', it consists of two components: targeted gene therapy to make the muscles of the upper airway sensitive to light, and a slimline oral appliance that delivers light stimuli to activate those muscles and keep the upper airway open during sleep.

### > **Better solutions for life-threatening heart conditions**

A collaborative team led by A/Prof Jelena Rnjak-Kovacina is developing a new generation of valve leaflets for use in transcatheter aortic valve implantation (TAVI), a procedure that can help improve quality of life in patients who otherwise have limited choices for repair of their aortic valve. The leaflets are made from biomaterials that have excellent blood compatibility, tissue remodelling, mechanical and calcification properties.

### > **The future of remotely monitored clinical care**

TeleClinical Care (TCC) is a MedTech platform designed to enable the remote monitoring of cardiac patients. It grew out of a partnership between Tyree IHealthE and South Eastern Sydney LHD (SESLHD), and was led by Professor Nigel Lovell and A/Prof Sze-Yuan Ooi. During the pandemic, the platform was adapted to support remote monitoring of COVID patients and is now being expanded to monitor and empower patients with other clinical needs.

### > **Helping people with Parkinson's walk better and for longer**

A team led by Dr Matthew Brodie, supported by the Connected Health Software Foundry, has developed and launched the Walking Tall app. Co-designed by people living with Parkinson's Disease, the app helps train people who have Parkinson's to improve their gait. The app is now in use and has already helped 3,000 people.

### > **Enabling participation through assistive technology**

Rowing is a sport that proved a challenge for people with cerebral palsy, until the recent development of modified oars, led by A/Prof Lauren Kark in the Assistive Technology Hub. Lauren worked with a team comprising students, orthotists, and athletes from a community rowing club to develop the modifications.





## Our current capabilities

### > Embedded electronics

Electrical and electronic engineering expertise to develop hardware and software components for wearable and implantable MedTech devices.

### > Software Foundry

Expertise in the design, trialling, implementation and maintenance of software, apps and systems, including support for integration into Electronic Medical Records.

### > Business and commercialisation advice

Expertise to help assess the commercial potential of MedTech solutions, support the development of business plans and facilitate progress towards commercial milestones.



## Our capabilities in development

### > Rapid prototyping

Equipment and expertise to support the rapid development and iteration of proof-of-concept prototypes, enabling early data collection and informing funding applications.

### > Product design

Expertise in user-centred and industrial design for the development of medical devices that are user-friendly and feasible to manufacture.

### > Functional characterisation of medical devices

Equipment and expertise to support the functional characterisation and testing of medical devices to generate pre-clinical data.

### > Computational modelling

Expertise in developing computational models to simulate and study complex systems including cell interactions, molecular processes, tissues and organs.

### > Data analytics and machine learning

Expertise in deploying biosignal processing, data analytics and machine-learning algorithms and models to help generate timely insights for more effective and personalised delivery of care and decision-making support.

### > Data infrastructure

Expertise in leveraging data infrastructure services to house, exchange and transmit data and algorithms between research and clinical environments.

### > Clinical implementation

Expertise in mapping and enhancing clinical processes to support the successful implementation of digital products within the clinical workflow to maximise utility and clinical adoption.



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## Engage with us



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UNSW Tyree Foundation Institute of Health Engineering

**Do you have an unmet clinical need or an idea  
for a healthcare solution? We can help you.**



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