

**MedTech  
SuperConnector™**

# MARRYING CREATIVE DESIGN WITH TECHNOLOGY AT THE ROYAL COLLEGE OF ART (RCA)

ROYAL COLLEGE OF ART CASE STUDY  
JUNE 2022



**Research  
England**



**Imperial College  
London**

**ICR** The Institute of  
Cancer Research

**Queen Mary**  
University of London

**Royal College of Art**

**ROYAL COLLEGE OF MUSIC**  
*London*

**RVC** Royal  
Veterinary  
College  
University of London

In 2018, [MedTech SuperConnector \(MTSC\)](#) became one of 18 innovative projects funded by Research England's [Connecting Capability Fund \(CCF\)](#). The goal of the MTSC is to engage in strategic collaboration with higher education institutions (HEI) and research partners; to increase commercialisation potential of research outputs; and to contribute to economic growth in line with the UK government's Innovation Strategy. The [RCA](#) is one of eight partner institutions within the MTSC consortium, led by [Imperial College London](#). An open experiment in medtech acceleration, MTSC programmes are set up to support early career researchers (ECRs) fast-track the commercialisation of their early-stage medtech innovations. In doing so it aims to share the resulting learnings and best practice across the consortium partners to become a world leading organisation for supporting and accelerating the commercialisation of early-stage medtech innovations. After the three-year experimental phase, the MTSC is now collating the learnings and impact of the programme. It has recently been awarded two further years of funding in a follow-up round from the Connecting Capability Fund, enabling it to continue supporting medtech innovations and expand its offering.



Caroline Yan Zheng pitching SimTouch at the Cohort One Showcase



Dongyuan Li, Haptic Illusions, participated in Cohort Three. Pictured at the MTSC Boot Camp.



Laura Salisbury, KnitRegen, has gained seed funding and earned numerous awards since her participation in Cohort Three.

# The Royal College of Art

The RCA, a postgraduate institution with some 2,500 students, is ranked as the world's top university in art and design. With alumni including Barbara Hepworth, David Hockney, Tracey Emin, Ridley Scott and James Dyson, the RCA has an almost unrivalled reputation and influence in its field. More than this though, the RCA's vision for the future is to marry creative arts and design with science and technology, in order to drive innovation and sustainable growth and tackle global societal challenges – for example, future cities, future transport, healthcare and ageing.

The RCA achieves this through world-leading cross-disciplinary research, design-driven technological innovation and a unique educational approach. Indeed, for 40 years the RCA has jointly run a pioneering [double Master's Programme \(MA/MSc\) in Innovation Design Engineering \(IDE\)](#) with Imperial College London. To help students, alumni and staff commercialise their ideas and build successful businesses, the RCA also operates an award-winning incubator, [InnovationRCA](#).

Healthcare is an area which has been prominent within the RCA research

and knowledge exchange portfolio, as the importance of human-centred design in medical innovation is increasingly recognised. Notably the [Healthcare Innovation Exchange \(HELIX\) Centre](#) – a collaboration between the RCA's Helen Hamlyn Centre for Design and Imperial – brings together design researchers and clinical staff to tackle the big demands in healthcare today.

Initiatives like InnovationRCA, HELIX, IDE and the Robotics Laboratory, all provided an ideal foundation for the MTSC to build upon, and crucially support a truly diverse spectrum of early-stage ideas.

Head of Knowledge Exchange at the RCA, Tatiana Schofield, comments: “The MTSC helped us build upon our existing capacity in healthcare innovation and scale-up our expertise in the area. The MTSC's success is in its cross-disciplinary technological innovation, human-centred approach and critical thinking, which is brought to the MTSC by creative partners like the RCA and the Royal College of Music (RCM).”

Dr Sina Sareh, Reader in Robotics and Design Intelligence and Academic Leader for the RCA Robotics Laboratory, adds to this sentiment: “By bringing in design elements at the very earliest stages of research and development, you increase the chance

for acceptability of the technology for human use and I think there is an increasing body of evidence to support this view.”

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“We’re pairing great design with science”

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## The Royal College of Art and MTSC



**£356,759**  
total funding awarded



**3**  
innovative wearable devices developed



**£9 million**  
follow-on funding from public and private investors

### Leveraging external investment

That approach is writ large in the projects of the five RCA ECRs that have been supported by the programme. Two of those ECRs, Lucy Jung and Laura Salisbury have now launched fully-fledged companies that have attracted significant external, private investment. [Charco Neurotech](#), headed by Lucy, has developed a discreet, elegant

wearable device that delivers focused vibrotactile stimulation to reduce symptoms of slowness and stiffness in people with Parkinson’s Disease. In 2021, the company raised \$10 million from Amadeus Capital Partners Parkwalk Advisors and others – thought to be the largest seed financing round that year in Europe for a health technology device.

Meanwhile, Laura’s company [KnitRegen](#) is developing smart textiles to help people who have neurological conditions recover upper limb function. The company has attracted seed funding from Venrex Investment Management LLP in order to develop its first functional garment for brain injury survivors by summer 2022. Laura herself also won a Future Leaders Fellowship from UKRI, worth £1.2million, and the Health Award from the Mayor of London’s Entrepreneur Competition.

Laura explains her design philosophy, which dovetails with the RCA approach: “We’re pairing great design with science, understanding people’s behaviours and trying to create a really desirable, useable and suitable product that isn’t stigmatising,” she says.

She adds: “The experience with MTSC changed everything for the venture. It provided critical opportunities for

understanding what is involved in entrepreneurship that has ultimately contributed to where we are today.”

## Building capacity in robotics

One specific area where the MTSC has really brought tangible benefits to the research and innovation is that of robotics – particularly soft robotics with applications in healthcare. In 2017, the RCA established the RCA Robotics Laboratory led by Dr Sina Sareh who has been building capacity in different sectors and industries.

Sina has supervised four students from different MTSC cohorts. All ventures have used soft robotics, as well as other technologies such as virtual reality (VR), to either improve the performance of doctors or bring benefits to patient wellbeing.

For example, Dongyuan Li’s project, called Haptic Illusion, saw him create an innovative new setup for training doctors and medical students in palpation (feeling for differences in tissue type that might indicate disease such as a tumour). Usually, this is done using expensive rubber models. But Dongyuan was able to simulate palpation using soft robotics coupled with VR in a more immersive and cost-effective manner. Using some of the same underlying technology, Yaqi Xie, another RCA ECR, came up with a

completely different application – assisting patients in both conscious and unconscious states to self-report their pain symptoms (Topographies of Pain).

“The MTSC has certainly made our portfolio richer in specific areas,” Sina says. “We have increased capacity, both in terms of the equipment and setup we now have and perhaps more importantly the lab skills that our team has gained this area. What that means is we are now more ready to support future projects in this area – so if a new project comes along, we can start from day one and apply this know-how in different areas of medicine.”

## PROJECTS SUPPORTED

### Charco Neurotech

Discreet wearable devices to reduce slowness and stiffness in people with Parkinson’s Disease.

### Haptic Illusion

Immersive palpation training for doctors and medical students, using a haptic interface and virtual reality.

### KnitRegen

Smart textile garments to help people who have neurological conditions recover upper limb function

### SimTouch

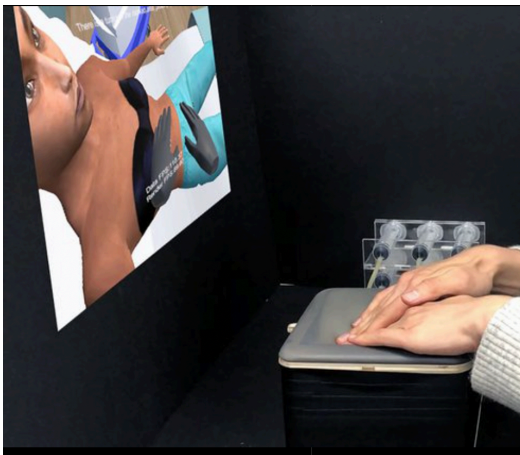
Simulating human affective touch to aid mental health with elegant wearable devices

### Topographies of Pain

Helping patients in both conscious and unconscious states to self-report pain symptoms through a visual and tactile interface.



Charco Neurotech's CUE1 device.



Haptic Illusion in use, simulating palpitation using VR and soft robotics.

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“...we are now more ready to support futures projects in this area”

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## Forging new connections

The MTSC has been instrumental in helping the RCA forge new connections. For example, building on deep and historic ties between the RCA and Imperial, Sina has been

working with Alison McGregor, a Professor of Musculoskeletal Biodynamics at Imperial’s Department of Surgery and Cancer, progressing ideas that came out of the MTSC. This has helped in facilitating access to clinical settings and patient groups. The team has also explored some collaborations with the pharmaceutical firm GSK.

It has also helped connections more broadly, at a national level. The MTSC is a Connecting Capability Fund (CCF) project from Research England and makes up an important cornerstone of the government’s industrial strategy. There are 17 other CCFs across different areas focusing on everything from the internet of things to agritech. Using its design capabilities and user-driven innovation, the RCA was invited to become an associate, then full, member of a CCF called [ASPECT \(A Social sciences Platform for Entrepreneurship, Commercialisation and Transformation\)](#). Led by London School of Economics (LSE), ASPECT aims to support innovation, entrepreneurship, and research commercialisation in social sciences.

The MTSC and ASPECT are now exploring potential collaborations and cross-fertilisation of ideas, bringing arts, design and social sciences to drive innovation, economic recovery and sustainable development.

“We believe art, design and social science are key enabling factors for innovation and we are big advocates of both STEAM – Science, Technology, Engineering, Arts and Maths – and SHAPE – Social Sciences Humanities & the Arts for People and the Economy – agenda,” says Tatiana.

It’s clear that the RCA is writing an exciting new chapter in human-centred medical innovation to add to its long, rich history of creative endeavour and technological innovation.

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