MedTech SuperConnector™

# CONNECTING CAPABILITIES TO DRIVE FORWARD MEDTECH INNOVATION

## QUEEN MARY UNIVERSITY OF LONDON CASE STUDY

MAY 2021


UKRI Research England

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In 2018, MedTech SuperConnector (MTSC) became one of 18 innovative projects funded by Research England's Connecting Capability Fund (CCF). Combining their knowledge through strategic collaborations, Higher Education Institutes would contribute to the aims of the UK government. The projects would strengthen their contributions to economic growth as well as support the delivery of objectives in the government's industrial strategy. MTSC, a consortium of institutions led by Imperial College London, includes Queen Mary University of London (QMUL) as a project partner.

An open experiment in medtech acceleration, MTSC programmes are setup 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. Nearing the end of the three-year experiment, the MTSC is now collating the learnings and impact on the partner institutions and venture development from participating in this experiment. It has also 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.

***"A researcher's main priority is to discover, not commercialise. "***


*Dr Maryam Abdollahyan presenting to investors and industry at MTSC's Cohort 2 Showcase in 2019*

# QUEEN MARY UNIVERSITY OF LONDON

The Queen Mary University of London (QMUL) is a leading research institution in the UK, reporting eight different types of impact from research, primarily in health, technology and culture (REF 2014). QMUL's Barts and The London School of Medicine and Dentistry (SMD) is regularly ranked as one of the best medical and dental schools in the country.

QMUL's technology transfer office, Queen Mary Innovation Ltd.(QMI), works alongside MTSC. Within QMUL it identifies and protects early-stage innovations, developing them through licensing or spin-out companies and provides proof of concept and translational research funding. Their inventions fit mainly into two categories - biopharmaceuticals or technology and engineering, with life sciences-related technologies making up the majority.

Ms. Eleftheria Ledaki, Commercialisation Manager at QMI's Biopharma team, supporting the projects and ensuring participants maintain momentum after the programme.

Ms Ledaki has taken an active role in MTSC's longer term continuation and sustainability plans, working alongside the consortium to apply for follow on funding and discussing business models. She's hoping that QMUL's role at MTSC continues to be active and the opportunities to get involved grow.

Throughout the four cohorts so far, six QMUL researchers have been supported by the programme. Out of those, five projects have applications in mental health or dermatology and cosmetology.

Four of the participants were awarded spots on MTSC's Challenge Accelerators – programmes in which participants are asked to repurpose a technology to solve a specific challenge that fits into a broader theme. This approach is often compatible with a technology platform – a technology that is used as a base upon which other applications, processes or technologies are developed. This means that with some commercial validation and tweaking, they can be adapted for use to a particular need or industry and the participants leave the programme with more experience and understanding of how to do this.

## QUEEN MARY UNIVERSITY OF LONDON AND MTSC

**£582,359.97**
total funding awarded

**4**
digital / eHealth solutions

**7**
jobs created

**£1,303,666**
Grants and Investment direct to ventures

## PROJECTS SUPPORTED

| Keratify | Semantica | Happy Hub |
|---|---|---|
| Skin culture platform to improve skin modelling and drug testing | AI tool that analyses doctor-patient conversations for early detection of mental health problems | Improving workplace productivity for large organisations through stress management |

For QMUL the value and benefit is the ability of the programme to support promising ideas that have not reached the proof of concept stage and are therefore riskier.

"If the project is just an idea or there are preliminary results that don't actually show effectiveness of a novel method, validation or accuracy for a diagnostic test, efficacy of a therapy in a specific model or they are just not novel… QMI is not able to support those projects as it would need significant development to be considered for commercialisation''.

"However, in those really early-stage concepts, we can guide the academics on what could potentially be inventive in their research and how to achieve it, make them aware of funding streams, as well as bring them in contact with QMUL's Business Development team that builds industry partnerships'' Ms Ledaki explains.

"MTSC comes to cover a really important gap in research commercialisation- the projects that have huge potential, but they need a boost to reach the stage where they can realise it. It provides part of that gap funding. In technology transfer we call it the Valley of Death."

***"A researcher's main priority is to discover, not commercialise. "***

## THE 'VALLEY OF DEATH'…

Cohort One Venture, Keratify, was founded by Dr Rosalind Hannen, a researcher at QMUL. The funding and network from MTSC provided essential support to establish and accelerate the venture and grow it into a spinout company from QMUL. Dr Hannen only narrowly avoided having to stop working on her venture due to a lack of available funding. MTSC was crucial at the beginning of her journey; "I was really fortunate with MTSC, I'd been applying for lots of grants, I knew what I was working on was important, but I was coming to the end of my contract and just missed out on many grants. Then I won the MTSC grant and it created a phenomenal opportunity to realise my vision. It opened the door to our success."

"It has been pivotal," Ms Ledaki says, "because [Dr Hannen's] project was really early-stage."

Dr Hannen credits her progress to the knowledge and tools she acquired on MTSC, the support of the university and the connections she made, including the current Board Observer and Advisor of Keratify, Rani Saad, who she describes as "instrumental" in developing the business. While she had the desire to apply her research practically to the 'real-world' and start a business, all of the opportunities gained by taking part in MTSC ensured she had the tools, the knowledge and network to support her in achieving it.

Around the time Dr Hannen began working on her venture, QMUL was evolving, and she credits this partly as the reason she was successful. The university had been building up the support network for technology translation and innovation, through initiatives such as the Ximbassador programme which supports commercialisation of QMUL research materials and tools.

"I think having initiatives like MTSC is absolutely phenomenal because it means that people from different environments and backgrounds have the opportunity to create something that they might not have done otherwise," she says.

## PROJECTS SUPPORTED

| BioBreathe | Restoring Aged Skin: From the Bottom Up | AI-driven transcutaneous Vagal Nerve stimulation device |
|---|---|---|
| Breathing better for your biology: bespoke breathing techniques for relief of anxiety & digestive disease | Combining high-throughput screening systems with compound libraries to identify compounds that reverse skin ageing. | We aim to develop a non-pharmacological device that can monitor an individual's heart rate and predict visceral pain |


Dr Rosalind Hannen presenting *Keratify* at the Cohort 2 MTSC Showcase in 2019.

After the programme, Dr Hannen needed to rapidly expand testing to develop Keratify's platform further. Another consortium member stepped in – Buck's New University and its consortium lead, Greta Paa-Kerner, who suggested to Dr Hannen that she take part in Bucks HSC Ventures; a programme with strong ties to Buckinghamshire Healthcare NHS Trust. They were a portal to plastic surgeons and other industry practitioners Dr Hannen needed to connect with to develop her venture.

Two years down the track, "things are about to kick off", Dr Hannen says. Keratify has recruited a multi-award winning-team, created new innovation, won two substantial Innovate UK awards, secured private investment and support from the largest dermatological and consumer goods companies in the world

However, Dr Hannen's Keratify technology isn't the only dermatology-based innovation to come out of QMUL.

Dr Matthew Caley, a participant in MTSC's Cohort Three, now lecturer in Cell Biology, has been working to use his research findings as the basis of creating a product or process with societal benefit. Dr Caley approached QMI with a novel screening system to identify compounds that could be used to treat or alleviate symptoms of skin disease or ageing, however due diligence conducted by QMI revealed that the system itself wasn't eligible for a patent application. He applied to MTSC on the suggestion of QMI and former participant Dr Rosalind Hannen and was soon speaking to colleagues and building his network of investors and cosmeceutical industry professionals.

"I found people that I could talk to about different aspects of taking research from the bench side to the clinic. I reached out and spoke to people who had experience in spin- outs, cosmeceuticals (the field I was interested in) and they helped focus what I want to do. They're people I continue to have discussions with. I've chatted with three very different people who have been able to give me advice completely separate from any of the people I've known previously from Queen Mary or my own research background," Dr Caley explains.

In the process he learned that "science isn't the be all and end all in cosmeceuticals." A complex combination of factors feed into decisions about whether to develop a product in this industry or indeed, if it would be successful or not.


Dr Sandra Jumbe at the Cohort 2 Hackathon, where she met her co-founders and developed the seed of an idea which would become Happy Hub

Dr Caley's new awareness of business and industry has changed the direction of his venture and while he isn't looking at developing a spin- out, he is now working on three distinct applications for his research. The first is providing access to the drug discovery and testing system developed as part of his venture, undertaking contract research work for industrial companies. The second is to develop drugs for Junctional Epidermolysis Bullosa (JEB), a rare genetic skin disease which is fatal for most sufferers early in life. The third is continuing to test and gather data on previously unknown anti-ageing compounds with the aim of protecting the rights to the compounds through patenting and eventually licensing the rights out to larger companies.

His awareness and understanding of commercial concepts, including the market size, route to market, contracts and the basics of intellectual property grew. This sense of how to take research from the bench to bedside means he has been able to respond to and take advantage of more commercial opportunities. Moreover, by exploring the social and commercial value of his technology MTSC did enable him to refine these ideas and the how and where they could be commercially viable.

Ms Ledaki who worked with him throughout assessing his new inventions and contract negotiations, saw this change in Dr Caley.

"He felt more confident speaking about the commercial aspect of his research…Matthew can easily grasp commercial and legal concepts. This indeed is really helpful for QMI, as academics with commercial acumen support fast forwarding the negotiations of agreements and the discussions with companies run smoothly."

During MTSC, he was able to use his funding to hire a new team member to focus on the JEB work as well as develop networks. One connection, a multinational consumer goods company, has since funded a PhD student to work with him, with another approved to begin in October 2021. MTSC journey has now made Dr Caley eligible to apply for the QMUL Impact Fund, he has been able to secure a number of translational grants to develop his work including a LifeArc Philanthropic Fund award.

## … TO THE HAPPY HUB

Dr Sandra Jumbe, a researcher in psychology and primary care, found herself lacking the tools to transform her expertise in wellbeing and stress management into a venture.

"I'd get invited ad-hoc by groups on Facebook or in my previous work in the NHS to deliver some stress management workshops over lunch...I always had this thing in my head that I wanted to make something more of it. So [MTSC] just kind of fit."

Dr Jumbe formed a team with a Master's student in data science, Alessandro Pio Greco and two other colleagues from Imperial College London who shared the workload, going to MTSC programme sessions on top of their normal working hours. Their colleagues later left Imperial and Dr Jumbe and Mr Pio Greco were joined by Dr Ukwuori Kalu, a clinical psychologist with private business experience. By the end of their MTSC experience, the team had explored their idea and knew what they wanted to create: "we interviewed a lot of people in finance, the police force, in the NHS and academia, got their insights and then tried to develop content but we never really got the chance to test it and pilot it [while on the programme]."

The team discovered unfamiliarity of entrepreneurship in academia, finding that it didn't fit within the traditional frameworks of a university activity, as it's neither research, teaching or connected to a traditional business function like human resources or finance.

Despite this, the Happy Hub team began working with QMUL's IT department and in February 2020 set up and released their platform. It provides brief stress management, deep breathing exercises and visualisations in the form of videos, suited to short breaks in a workday. The team is planning to use the platform to gather data on users' needs and eventually turn it into a service, providing in person sessions and wellbeing consultancy for workplaces, with the support of QMI.

Dr Jumbe and her colleagues across QMUL have taken the skills and knowledge gained on MTSC and used it to benefit other areas of their work to develop other ventures further. Dr Maryam Abdollahyan a post-doctoral research assistant who took part in Cohort Two with Dr Jumbe did exactly that. While Dr Abdollahyan's team is no longer working on their original idea, her learning from MTSC is informing the development of a second venture in health and wellbeing and has cited this as one of the most significant benefits for her.

"I would definitely recommend the experience, regardless of whether it will end up as a spin-out or not. The training, the exposure to the industry, the networking."

Both founders used their knowledge and innovative research in computer science and mathematics to improve mental health and wellbeing. While on MTSC, Dr Abdollahyan worked on Semantica, a venture which focuses on using algorithms to look for indicators of poor mental health or specific mental illnesses - like anxiety and depression - in patient interactions with General Practitioners. The venture gained good traction, however personal circumstances meant that founders couldn't commit as much time and effort as they wanted, putting strain on the team and stalling progress.

Both teams were ideal for the challenge accelerator because they had an in-depth understanding of the science, up to date research and some real-world experience. The next step was finding where it could provide valuable and beneficial solutions to social challenges with MTSC. However, their experiences suggest that the early stages (pre-revenue) of venture development require a team of people with the time and energy to drive it outside of their usual activities.

## A NEW PERSPECTIVE ON CONDUCTING RESEARCH

As we've seen MTSC contributes to QMI's project pipeline by developing existing ventures to a stage where they can be supported by QMI, but Ms Ledaki also thinks there is scope for the programme to "bring projects to light" through general calls for MTSC applications.

"When [academics] apply for MTSC it brings us visibility on which academics work on potentially novel research that we need to be aware of, especially if they are considering the spin-out route.''

The academic then develops their knowledge and understanding in areas like intellectual property law, venture capital investment, health economics, and the importance of developing a network, not only from the contacts they make and speak to but also through the education and everyday learning which is a part of MTSC. They also gain understanding of how medical technologies are developed for clinical applications and how they could be incorporated into the NHS and other health services around the world.

Ms Ledaki cites the importance of initiatives like MTSC in developing this awareness of clinical and commercial development "A researcher's main priority is to discover, not commercialise. If

research is published prior to filing for a patent application, it is challenging to partner, license the technology and generate investment, as exclusivity in the market is needed and a patent application provides those rights".'

As soon as researchers engage with QMI and MTSC, they are keen to learn about commercialisation and re-evaluate their perspective of publishing prior to discussing their innovative research with QMI.

This gives the venture a better chance of protecting the rights to life changing inventions and move towards benefiting patients.