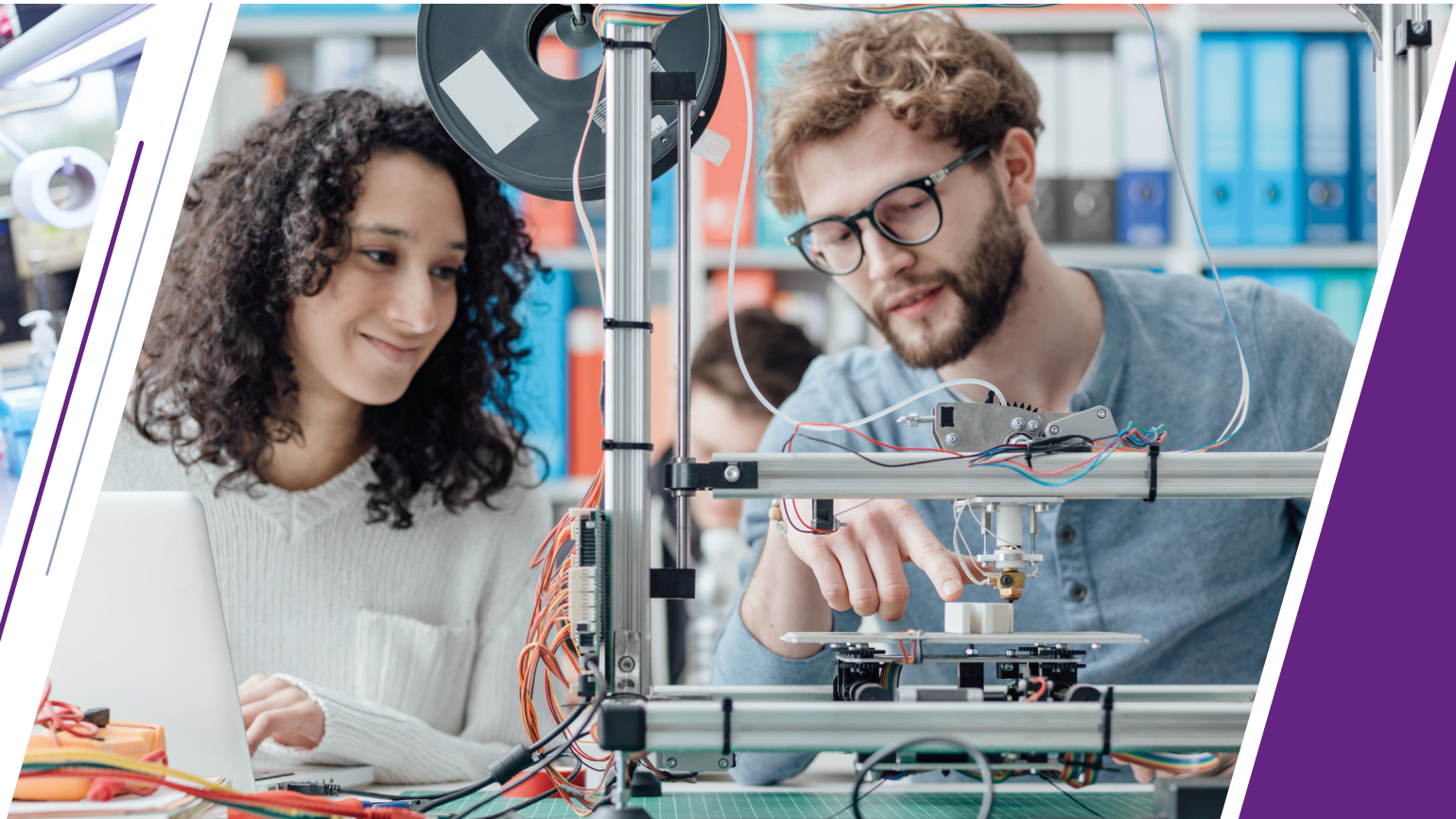
KING'S College LONDON

MedTech

INNOVATION & ENTREPRENEURSHIP MSc



Course leaders

Ute Stephan is Professor of Entrepreneurship at King's Business School and a Fellow of the International Association of Applied Psychology (IAAP).

As an expert on the Psychology of Entrepreneurship, Professor Stephan explores how individuals and societies can thrive through entrepreneurship.

Professor Stephan's research explores culture and institutions, social entrepreneurship and entrepreneurial motivation, well-being, and mental health. Her research is published in international leading scientific journals in management, entrepreneurship, international business and psychology.

Her research has won multiple international awards, attracted over £3 million in funding from the European Commission, the UK Government, UK research councils, charities and German government institutions; and has been featured in the media including the Financial Times, The Times, The Guardian, Wall Street Journal, Forbes, WIRED, BBC, AlJazeera, Bloomberg and others.

Professor Stephan has also led projects commissioned by UK Government Departments on social entrepreneurship and entrepreneurial aspirations. She currently leads a 30-country study on Entrepreneurship & Covid-19, and is also a lead investigator of the 10-country Social Enterprise as a Force (SEFORIS) and its predecessor the SELUSI project.

Professor Prashant Jha is Head of Affordable Medical Technologies at the School of Biomedical Engineering & Imaging Sciences and founder/co-director of the Clinician Innovators Program for King's Health Partners.

With a unique journey into the world of MedTech, Professor Jha is a physician-engineer-entrepreneur-editor-inventor. He has successfully created an ecosystem for innovating medical devices and technologies in Australia, Finland, India, Japan, and the UK.

He co-founded the School of International Biodesign (SiB) at the All India Institute of Medical Science (AIIMS) and the Indian Institute of Technology (IIT). Professor Jha also created and co-founded BMJ Innovations, the world's first general medical journal on innovations in healthcare.

Professor Jha has created many pioneering products using his 5D model: Discover, Define, Design, Develop and Deploy, including orthopaedic immobilisers for fractures and tools to make surgery more efficient.

As well as supporting King's students, Prashant advises medical device corporations, design studios, NGOs and MedTech start-ups on strategies and projects for innovating value-conscious and value-creating products and services.

Build **Experience** // *Discover* **Purpose** // *Create* **Impact** //

The MSc in MedTech Innovation and Entrepreneurship brings together talented students and professionals from a range of backgrounds across the spectrum of health, engineering, design, business and entrepreneurship, who are committed to creating innovation in health and making the world a healthier place.

The programme builds on King's strengths to teach both crucial business knowledge and know-how in developing novel medical technologies that address unmet clinical needs.

With unparalleled access to our National Health Service (NHS) hospitals, our students will develop a deep appreciation of healthcare delivery and quality improvement processes to apply their knowledge for developing novel medical technologies and a fulfilling career as a MedTech entrepreneur, innovator, consultant, advisor or a leader in the medical technology industry.

The MSc is delivered jointly by King's Business School and the Faculty of Medicine and Life Science's School of Biomedical Engineering and Imaging Sciences.

Do you accept the world as it is or do you question it?

Join us to engineer better health for the world.

How the future of Healthcare is changing

The healthcare landscape is constantly evolving. As we are living longer than ever before, we need to continue focusing on maintaining a high quality of life for our global population. We need to continue improving patient value relative to cost and enhance the patient experience. This is in addition to ensuring efficient functioning of our hospitals and healthcare providers.

"**MedTech is more than tech. Innovation should be coupled with understanding of patients needs and clinical use. Getting something to the patients needs regulatory understanding and vision of the commercialisation pipeline. Engineers can be trained to know these things – and that's what this MSc offers,**" says Dr Christos Bergeles, Senior Lecturer, Biomedical Engineering & Imaging Sciences.

While new innovative technology is key to helping maintain healthy lives and bolster an efficient provision of care, there are still significant gaps in enabling technology and supporting rapid translation of medical devices.

Future healthcare technology requires a diverse skillset from a diverse academic base but also commercial aptitude to ensure acceleration of key technologies that can make a difference to patients and hospitals.

Healthcare is everyone's business, involving many different people and organisations. Health is a spectrum running from policy to manufacturing, opening up a lot of opportunities in different areas. So, what are you waiting for?

> "Innovation should be coupled with understanding of patients needs and clinical use.
>
> *Dr Christos Bergeles, Senior Lecturer*

Young Entrepreneur's case study: CoolZEN

A novel wearable medical device, CoolZEN, was developed by undergraduate Biomedical Engineering students Nitya Dintakurti and Shreya Kalyanasundaram.

From undergraduate students to thriving entrepreneurs, Nitya and Shreya applied their biomedical engineering learnings and developed their ISO certified company Ru Medical following the success of CoolZEN.

A smart, wearable device to alleviate the effects of Hot Flashes in menopausal women, Coolzen provides an innovative solution in a market that does not offer much in terms of non-pharmaceutical solutions. Ru medical's mission is not to just alleviate the symptoms of hot flashes but to restore confidence in women who are in the prime of their careers.

Nitya and Shreya won the LondonTech Week 2021 and F-Factor awards, and also published a paper in one of the biggest women's health journals in the world – the first undergraduate students to do so.

"There are global efforts to improve the health of women largely focusing on improving sexual and reproductive health. However, Menopause is an area of women's health that has relatively lacked consistent treatment and awareness. At Ru Medical, we are changing the game for menopausal women via innovative medical technologies. We've had a very successful year and I am excited for what's ahead for us!" – Shreya Kalyanasundaram, co-founder.

"Menopause affects half of the world's population and is one of the most massive unmet clinical needs. At Ru Medical we are trying to bridge this gap in the healthcare system and help improve the lives of women around the world. Starting with menopause we hope to be the one stop women's health companion!" – Nitya Dintakurti, co-founder.

> "CoolZEN will be a game-changer in the way women manage and treat their menopausal symptoms.
>
> *Shreya Kalyanasundaram, co-founder*

Winner
of LondonTech Week 2021

Shaping the future of healthcare with the 5D model

The 5D model has evolved and been refined over the last ten years. Initially it was only intended for people who wanted to create start-ups. Now it's for anyone who wants to become more entrepreneurial in their thinking, as well as intrapreneurs who want to improve processes where they are employed.

Fail early, fast and small

The 5D model is about focussing on what people want and what people will use. The process doesn't allow failures of this kind. If you fail, you fail early, fail small and fail fast. There is no need to burn energy and spend years of your career creating something without purpose.

The importance of empathy

Anyone who follows the 5D model is not given a set of instructions. They are given guidance, but it is up to them to find a problem that they are inspired to solve.

There is one aspect in particular that completely differentiates this approach from others – the role of empathy. Students meet the people who need them to create a solution that works. Discovering what this is starts with the first step of the 5D model.

Learn what you love. Apply what you learn.

Our MSc MedTech Innovation & Entrepreneurship at King's College London has been designed to help students through the 5D model. Traditionally you pick a course that sits under one Faculty. That is not the case with this programme. We have united medicine and business to help students fix real-world problems.

To be a change maker, you need to find what you love. You should be able to navigate different disciplines rather than a rigid set of areas. At King's, you have expertise from all areas at your fingertips. Is your innovation around AI? Talk to our data scientists. Need to develop specialist knowledge in an area of healthcare? The right person is on hand.

The main two principles of the programme are: learn what you love and apply what you learn. But perhaps the real products of the 5D model are the people who've benefitted from this approach to solving problems – and who have gone on to create successful companies around the world.

// STEP 1: Discover

How do you find a problem worth solving? You discover what inspires you and interact with the people you'll help – patients, nurses, physiotherapists and more. You develop empathy and a drive to solve that issue no matter what.

Discovery isn't about sitting in front of a computer screen. It's about experiencing a problem first-hand and seeing those unmet needs. During this process people become more resilient: they don't jump ship at the first problem they encounter as they understand the potential impact of their work.

As part of their engineering degree, two students went through the 5D model. Their Discover phase involved identifying an area of healthcare they wanted to explore. At the end of this phase, they zeroed in on elevating the symptoms of the menopause for women.

While hormone replacement therapy (HRT) is effective, it doesn't suit all women due to the side effects and possible cancer risk. Many women turn to herbal remedies. However, there aren't many options available, so the students knew they wanted to create a non-drug solution.

Their innovation CoolZEN is a wearable device that detects hot flushes and leverages a natural physiological response to bring relief. These students have won multiple awards including winning the F-Factor startup competition for the Greater London region.

// STEP 2: Define

If Discover is about falling in love with problems, Define is about finding a problem to get married to. The one that you'll dedicate your time to fixing. You need to determine which problem you can solve within the constraints you face.

There are many market intelligence skills needed for this stage and a lot of questions to ask: who will support this idea? Who will resist change? Who will be your competitors? Answering all of these questions is critical to moving forward to the next of step of the 5D model.

The secret to Discover is deciding on a problem where a less-than-perfect solution will sell. People are so frustrated that they will need your solution. Enter FlexiOH, a product that was created with students, clinicians and an engineer who were looking for an alternative for plaster casts for broken bones. The key problems: they're bulky, you can't scratch, and you can't get them wet. The end result, FlexiOH ®, the first of its kind orthopaedic immobilizer, has the rigidity to hold the fractured part as well as providing proper skin ventilation.

// STEP 3: Design

Design is where you let your imagination run wild. Forget any constraints. You need to come up with hundreds of ideas and engage with your end user. Welcome critiques, listen to suggestions, then improve.

The important thing is not to fall in love with any of them quite yet. A common trap many of us fall into is thinking our ideas are superior, but an idea is just an idea: don't label them as good or bad yet.

Design overcomes another problem too. When you talk about an idea it's clear in your head, but as soon as you explain it to someone else, they create their own version in their head too. That's why we switch 'think and talk' for 'show and tell'.

Sound expensive? It's not. All you need is paper, scissors and glue. Or maybe clay. It's low cost but gives you the opportunity to test plenty of ideas and explore the issues you might encounter.

// STEP 4: Develop

Now you have an idea you can develop. One that you are confident will be manufacturable and has the potential to be patented.

Develop is when you take action, whether this involves hiring a team, securing a grant or applying for internal funding.

This stage tends to take one to three years, but it could take longer.

For MedTech products and services, there are many boxes to tick. Is it safe? Is a human or animal trial necessary? Will you be able to convince the regulators?

// STEP 5: Deploy

Deploy is the period of joy when the product or service is released into the world. Sales start. The unit is fully-fledged. Or you own your own organisation. Your solution is ready to be delivered to the world and alleviate the frustration of the end user.

Another innovation that has resulted from applying the 5D model is a smartphone app. It needs nothing from you. It simply observes how you are using your device to detect changes in your mood. The app has the potential to help people with a range of mental health issues, from anxiety to bipolar disorder.

The students decided the first version should be released for college and university students. They can submit anonymised data to their counselling service to help the professionals flag issues early and provide help quicker, potentially preventing suicides.

Course overview

> Our MSc presents a unique opportunity to students looking to make a tangible difference to healthcare.
>
> *Professor Sebastien Ourselin FREng, Head, School of Biomedical Engineering & Imaging Sciences*

Course Benefits

- Unrivalled location in the centre of London
- The course is a unique combination of core entrepreneurship and innovation (i.e. 'business') content with dedicated health-care and MedTech content
- Students will have hospital access through King's Hospitals and partnerships with the NHS, so students are able to immerse in real-world healthcare settings shadowing clinicians and other healthcare practitioners. This will help them collaborate and develop innovations and start-up projects based on a deep understanding of real-world medical and patient requirements
- The course is strongly connected into King's industry networks and provides a practical route for students and participants to ideate, test, innovate and develop their ideas and and launch innovation projects or start-ups in the UK and around the world
- Students will be offered an option to work on live-projects with the medical-technology industry in the UK, Europe and around the globe
- The course offers a unique opportunity to learn from medical practitioners, industry professionals, innovators, entrepreneurs, and study across business and engineering schools at King's College London

Core Modules

You are required to take:

- MedTech innovation, ideation, design, and research methodologies *(30 credits)* Foundations of entrepreneurship and management I: Entrepreneurial strategy and growth *(15 credits)*
- Foundations of entrepreneurship and management II: Entrepreneurial finance & marketing *(15 credits)*
- Entrepreneurial Leadership *(15 credits)*
- Medical Technology Design and Development Pathways from Idea to Impact *(15 credits)*
- Project development (dissertation) *(60 credits)*

Optional Modules

emphasis on flexibility and following your own curiosity

In addition, students take 15 credits from a range of optional modules which include:

- Value driven technologies for global health (Invent with King's) *(15 credits)*
- An optional Technology/Healthcare Module *(15 credits)*
- Quality Management systems, Regulation, Intellectual Property Rights, Health Technology Assessment *(15 credits)*

King's College London reviews the modules offered on a regular basis to provide up-to-date, innovative and relevant programmes of study. Therefore, modules offered may change. We suggest you keep an eye on the course finder on our website for updates.

About

School of Biomedical Engineering & Imaging Sciences

We believe in a truly integrated approach to healthcare engineering, which is why our collaborative research projects encompass everything from the development of novel imaging tracers right through to micro-robotic and artificial intelligence solutions.

A set of departments comprising physicists, chemists, biologists, engineers, computer scientists, mathematicians and clinicians, our combined expertise allows us to see clinical challenges from all angles to develop patient-focused solutions. Our expert advisors support the development process at every step of the way, from proof-of-concept studies all the way to Phase III clinical trials, to ensure translation to the clinic can happen wherever possible.

From undergraduate students to patient volunteers, clinical academics to professional services, every member of the School contributes to making this vision a reality.

About

King's Business School

We undertake ground-breaking research that improves the way people do business. And we engage with organisations around the world to create real value for society.

Since 1989, King's Business School has grown into a leading management institution – and one of the largest in London. We are ranked 8th in the UK for our highly regarded original research in business and management

We're a friendly, diverse community committed to the highest quality teaching and research. People from over 80 countries come here to study with us, and we're proud of the varied perspectives they bring to our School.

Being in the heart of London, our students and academics have unlimited opportunities for collaboration, research, and developing their career prospects. From bold new start-ups to multinational conglomerates, businesses inform our teaching and benefit from our work.

People from over 80 countries
come to study with us

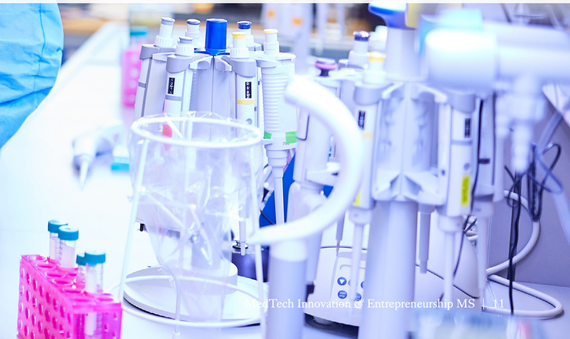
Apply now

Join us to engineer better health for the world.

Interested in engineering better health? Learn more on our course pages and apply today. You can also chat to students and lecturers to get an even better sense of the course.

Apply online or find out more

www.kcl.ac.uk/study/postgraduate-taught/courses/medtech-innovation-entrepreneurship



Spring School

This 15-credit module is offered during either the Spring/Summer/Autumn and is suitable for anyone interested in learning the art and science of innovating novel healthcare technologies and services.

You'll be coached by clinicians, designers, engineers, business consultants, academics, scientists, and entrepreneurs in developing an understanding of discovering unmet healthcare needs, defining the constraints in which the unmet healthcare need must be solved, and applying human-centric design principles to design novel healthcare technologies and services.

You'll be visiting healthcare facilities at Guys and St Thomas' hospitals and King's College Hospital and you'll interact with healthcare practitioners from all over the world. This type of access will allow you to rally develop an appreciation of interconnectedness and interdependencies of the healthcare system. From the Entrepreneurial side of things, you'll learn from designers and intellectual property experts on various facets of creating and protecting new technologies. Plus, you will be coached by King's Entrepreneurship Institute in pitching new ideas and by King's Business School in creating business plans that focus on affordability at the core of innovation.

This module can help usher you into a career in MedTech innovation, research and development, management consulting as well as setting-up a MedTech start-up.

The 15 credits earned post successful completion of this module can be used towards the credit requirements of the King's MSc in MedTech Innovation and Entrepreneurship program.

"Entrepreneurship and innovation are essential career skills to navigate and thrive in the dynamic world with all its challenges in the 21st century. We will support you in developing these skills in the growth markets of MedTech and healthcare. Both for your benefit and for the benefit of society.

Professor Ute Stephan

"I measure success of innovations by only one metric – the number of human lives it touched. The joy you will have from healing lives through technology and business innovations would be incredible. Join us in making the world a healthier place."

Professor Prashant Jha