QMB Innovation Centre

QUEEN MARY BIOENTERPRISES

H1 2022

Discovery

NEWS, VIEWS AND EVENTS AT QMB

IN THIS ISSUE

QMB Innovation Centre
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WELCOME

EDITOR'S WELCOME

Welcome to the summer 2022 issue of QMB's Newsletter.

In this issue we caught up with Professor Andrew Livingston, Queen Mary University of London's Vice Principal for Research and Innovation.

Prof Livingston is a chemical engineer with well over 300 publications and 20 patents to his name, and is well suited to head up research and innovation at the University, having founded and headed up Membrane Extraction Technology, which was acquired in 2010 by German chemical major Evonik, and then as CEO of new start-up Exactmer.

In other news, we caught up with Sven Bunn, Life Sciences Programme Director at Barts Health NHS Trust / Queen Mary University of London, on the Whitechapel Life Science cluster, and Queen Mary's plans for the development of a state-of-the-art life sciences centre in Whitechapel which will house the Precision Healthcare University Research Institute (URI).

We've also got the latest news from QMB's sister organisation, Queen Mary Innovation, which has just helped Queen Mary spin-out company Enterika Ltd secure funding from the Queen Mary Investment Fund (QMIF), a new investment fund to help commercialise the university's world-class research and to support early-stage business spin-outs.

We hear from QMB tenants BGI who have got approval to extend their HotMPS sequencing offering to the UK market, hVIVO who are working on world's first Omicron challenge model and Mediwise who have just secured a US patent for glucoWISE®, a non-invasive glucose sensing system.

We also welcome Sheryl Malloy to our team her at QMB. Sheryl joins the team as Community Manager to oversee the running of the Queen Mary University Enterprise Zone. Sheryl has extensive customer service and hospitality experience spanning across New Zealand, Australia and UK.

We're eager to hear your views too, so please share your feedback. For more updates and the latest news from QMB, please visit our website.

Nas

Planning application submitted for Institute for Precision Healthcare in Whitechapel

Queen Mary University of London has submitted a planning application for the development of a state-of-the-art life sciences centre in Whitechapel.

The Precision Healthcare University Research Institute (URI) is Queen Mary's second URI, created as part of the University's ambitious Strategy 2030.

The new Precision Healthcare University Research Institute will support the Department of Health and Social Care's (DHSC) plans for a Whitechapel Life Sciences Cluster.

More broadly, the new Life Sciences cluster in Whitechapel will create a vibrant, new one million square feet research and innovation cluster that delivers benefits locally and globally.

Alongside the Queen Mary Life Sciences Building, three additional plots will be developed to provide wet and dry lab and office space for SMEs and industry. The total investment in the new cluster is in the region of £600m.

This new development will help to deliver a long-held local vision – shared with Barts Life Sciences, a partnership between Queen Mary and Barts Health NHS Trust, supported by Barts Charity – to establish east London as a major centre of excellence in life sciences, creating thousands of high-quality jobs and skills programmes, and attracting industry investment from start-ups to multi-national corporations.

NHS Property Services are leading on the project for DHSC, involving a planning application and transaction management for the whole cluster. The five plots of land, which are underused and contain mostly vacant buildings, cover an area equivalent to two and a half football pitches next to the Royal London Hospital.

The proposals aims to develop the area into a life sciences cluster, with a mixture of commercial life sciences and sector-related companies operating in tandem with the Royal London Hospital, one of the country's largest teaching hospitals.

"This landmark deal underlines Queen Mary's commitment to tackling health inequalities at a local, national and global level through world-class research, education and community engagement. These proposals will create much-needed life sciences space, for which there is high demand across London, allowing the success of the partnership to grow further," said Sven Bunn, Life Sciences Programme Director at Barts Health NHS Trust / Queen Mary University of London.

Queen Mary and Barts Health NHS Trust have a strong and long-standing partnership that has a track-record of delivering life-changing health outcomes, including for communities that are often under-represented in healthcare research and delivery, and education. Examples include the East London Genes & Health study that has helped identify the genetic determinants for specific illnesses, including Covid-19, among Bangladeshi and Pakistani communities.

Sven said: *"The continuation of these partnerships through Barts Life Sciences and the creation of the new Queen Mary facility will ensure developments in life science research will lead to improvements in health outcomes both for the diverse communities of east London and people all over the world."*

Meta Materials secures US patent for glucoWISE® non-invasive glucose sensing system

QMB tenant Mediwise has been granted a first U.S. patent (US 11,298,052 B2) for its glucoWISE® non-invasive glucose sensing system and related anti-reflection metamaterial films.

This foundational patent covers the anti-reflecting metamaterial films, which enhance signal penetration through the skin, and different configurations of the sensing system for collecting biomarker readings at various locations on the body. Co-inventors are Dr. Georgios "George" Palikaras, Dr. Efthymios "Themos" Kallos, and Dr. Helena Cano-Garcia.

"The granting of this patent in the United States is a key milestone in our glucoWISE® development plan," said Dr. Themos Kallos, META's co-founder and Chief Science Officer.

Themos added: *"This is our foundational patent on non-invasive biosensing using radio waves, built around the core idea of an ultra-thin metamaterial film that acts as an anti-reflection coating for the skin, leading to increased signal penetration to the tissue. It paves the way for a completely painless radio-wave-based glucose sensing system in the U.S., which is currently home to more than 30 million people living with diabetes."*

The glucoWISE® system in development is intended to allow monitoring of blood glucose levels without the need for painful finger sticks. META plans to first introduce a table-top version of the device, for use at home or in the clinic, followed by a pocket-sized, portable version to allow quick, painless monitoring anywhere, and subsequently, a wearable version.

In July 2021, META announced the completion of a UK-funded, 27-month project to develop a non-invasive glucose sensing prototype, which combined for the first time radio wave and optical sensors to improve accuracy in predicting glucose level changes. The development team has since expanded and is actively working on the next generation prototype, suitable for human studies in 2022.

"META's broad and rapidly growing intellectual property portfolio is a key element of our strategy to support growth and establish a durable competitive advantage," said George Palikaras, President and CEO.

George added: *"Dr. Shann Kerner joined us last September as Chief Intellectual Property Officer. Under her leadership, we just reached a key milestone, with 302 active utility and design patent documents, more than double compared to the 149 we announced at the Q2 report in August 2021."*

META's patent portfolio comprises 175 issued patents, including one design patent, and 127 pending patent applications, in 81 patent families, of which 48 include at least one granted patent. There are 15 active patent documents for glucoWISE®, including 5 issued patents, within 6 patent families, of which 3 include at least one issued patent.

Dr. Cano-Garcia in the London Office

QMB's **Meta Materials** acquires Plasma App Ltd in $20 million stock deal

Meta Materials Inc., the parent company of QMB tenant Mediwise, has acquired Plasma App Ltd in a stock-for-stock transaction valued at $20 million.

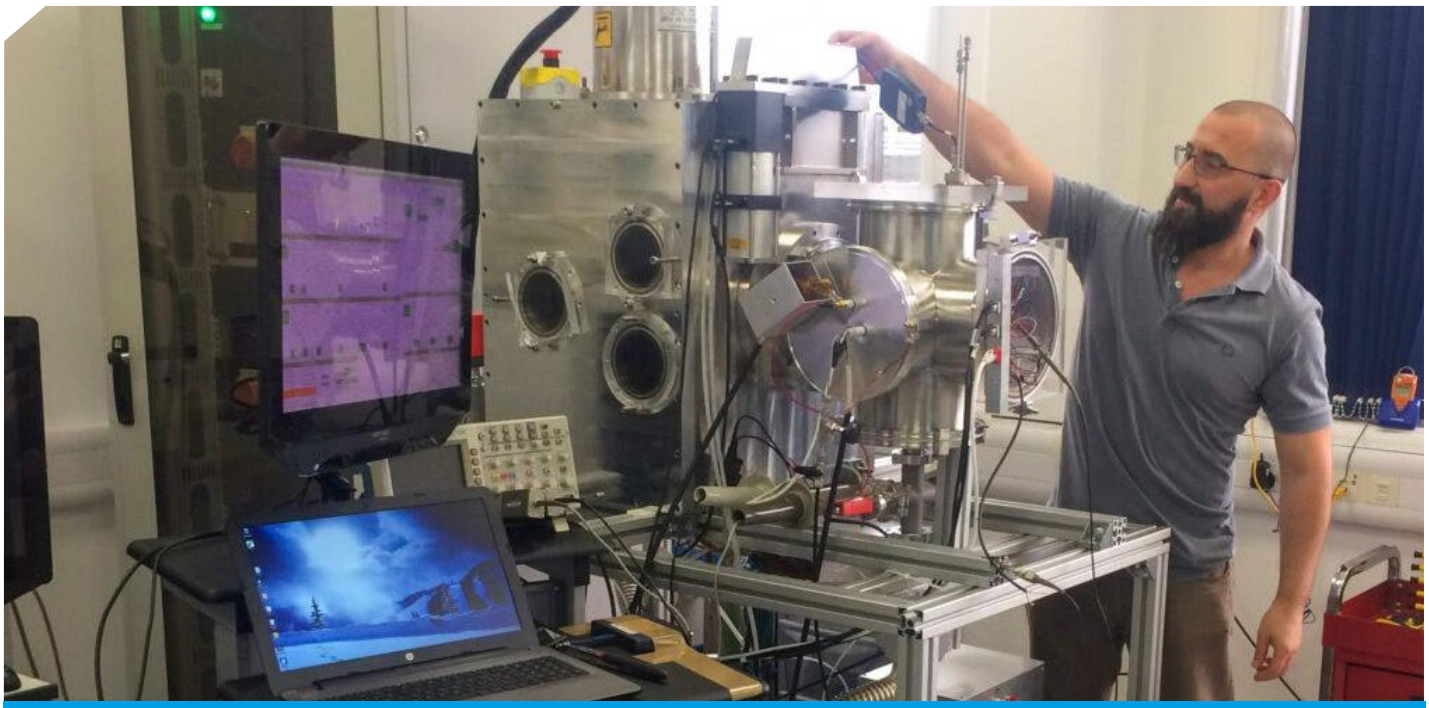
PAL is the developer of PLASMAfusion™, a first of its kind, proprietary manufacturing platform technology, which enables high speed coating of any solid material on any type of substrate. PAL's team is located at the Rutherford Appleton Laboratories in Oxford.

META expects to apply PLASMAfusion™ to the metallization step in its roll-to-roll production process for NANOWEB® films as well as KolourOptik® security films. This is expected to significantly accelerate line speed and increase annual capacity.

Large scale and efficient metallization is a critical step for volume production of NANOWEB® and many other high volume potential applications such as battery materials, requiring hundreds of millions of square meters per year. Large scale metallization is expected to leverage capital equipment investment and substantially reduce cost per square meter of output.

"This is a strategic acquisition for META, pairing the best nanopatterning technologies with the best coating technology. PLASMAfusion™ is a versatile coating platform technology, which we believe will improve our existing manufacturing processes, expand our IP portfolio, and open new markets," said George Palikaras, President and CEO of META.

George added: *"As we scale our operations, META is committed to investing in more sustainable technologies that reduce cost and increase volumes of our metamaterial applications. We have had a great relationship with PAL since 2019, and I am excited to welcome its founder, Dr. Dmitry Yarmolich, to META. We expect PLASMAfusion™ to enable META to deliver new solutions at unprecedented scale and cost, with semiconductor accuracy and quality."*



PLASMAfusion lab-scale tool

The Big Interview: Professor Andrew Livingston **QMUL's Vice Principal for Research and Innovation**


Professor Andrew Livingston

QMB caught up with renowned chemical engineer Prof Andrew Livingston, QMUL's Vice Principal for Research and Innovation. With well over 300 publications and 20 patents to his name, Prof Livingston was elected to the Fellowship of the Royal Academy of Engineering in 2006, and in 2008 was awarded a silver medal by the Academy for contributions to British engineering, followed by the Underwood Medal of the IChemE in 2016 for research into separations. In 2022 he was elected to The Royal Society which recognises, promotes, and supports excellence in science and encourages the development and use of science for the benefit of humanity. He is ideally suited to heading up research and innovation at the University, having founded and headed up Membrane Extraction Technology, which was acquired in 2010 by German chemical major Evonik, and then as CEO of new start-up Exactmer.

What have you learned the most from your years of experience in creating successful companies based on your academic research?

I've only really created two companies. The first one was successful, and the jury's out on the second one, but it's been successful so far. The thing I've learned more than anything else is that you have to be tenacious and stick with it. The other thing is to listen to everyone, but to think for yourself. Find your own way through the challenges.

As the leader of a start-up, you have to engage everybody's brains and all ideas must be welcome. As [Nobel Prize-winning chemist] Linus Pauling said: *"If you want to have good ideas you must have a lot of ideas."* Most of them will be wrong, and what you have to learn is which ones to throw away.

Do you find that you approach your academic work in the same way, as you approach your businesses?

My career has been built around knowledge. Knowledge has three parts: sharing, creation, and innovation or commercial application. Not everyone who works in creating new knowledge necessarily has an interest in using or commercialising it, and they shouldn't be forced to.

My academic research is more speculative. You don't know what the results will be, and the most important thing is to ask a good question and then try and answer it. In doing this, you'll create new knowledge.

Running a business takes focusing on the value of what you're doing. Research is proving something can work. But innovation is about making sure it works, every time and in different situations.

What do you think is the magic ingredient for creating a successful spin-out company?

You need a good idea. And it needs to be the right time for that idea. There have been many good ideas which just haven't come at the right time, and they haven't succeeded. And someone comes along 10 or 20 or 100 years later with the same idea and is very successful because it was the right time for it.

You need to innovate and come up with solutions. This means you need to be flexible, react quickly, come up with new ideas, and quickly discard paradigms that prove false or aren't useful. There's no room for dogma.

Commercial success is so difficult because it requires a combination of tenaciousness, a vision, a great idea, the right technology, capital and great timing.

How do you encourage innovation within a small business, and what are the biggest impediments to it?

It's a constant battle to ask people to be creative and to think past what they're doing today. If you're starting from a particular position, and you want to improve something, you take steps in different directions. You iterate and try and figure out the right direction to move in.

You often have a good idea but you're not sure what it's useful for, and this is not always apparent. That can be an impediment to finding the niche where it will work.

One of the challenges you're constantly faced with will be one of the delta. What's the difference between this new technology and what came before? If it's better, by how much? Because if it's not a lot better, why should people change?

Why do so many spin-out companies fail and what can be done to help companies to stay the course?

Companies fail because it's hard. When something's hard, you don't always succeed. I don't think that a company failing is an indication of there being something wrong with the system.

It's a survival thing. My rule is 'first survive, then thrive'.

We shouldn't have a fear of failure. We shouldn't denigrate it, otherwise no one will ever give anything a go.

However, in the UK, I'm not sure we spend as much on innovation as we need to, even though we spend quite a lot on research. I wonder about the balance between research and innovation expenditure. If you look at UKRI budget, Innovate UK takes up a small proportion of the total UKRI budget, and I always wonder if that's enough.

As the head of QMUL's Research and Innovation, can you tell me more about how your department is structured and what your team offers aspiring entrepreneurs?

We offer a number of different things across the entrepreneurial journey. Queen Mary Innovation Ltd (QMI) [a wholly-owned technology transfer company] is the formal vehicle for commercialising academic inventions that occur in research programmes, and has a fantastic team supporting our researchers as they seek to turn their new knowledge into things society can use.

We also have an Impact Acceleration Fund. So if you have an idea from one of your research projects, and you've done some great research and published it, but you're not sure if you can begin the journey to turning it into a business, then you could apply for funding which would allow you to do research which was not focused on writing papers but rather focused on innovation.

Our Queen Mary Enterprise Fund takes stakes in start-ups that come out of the university's research to allow them to get going, to make sure the route is there for the first steps of a new business.

We have set up an entrepreneurs club. We usually have a combination of some funder or venture capitalist (VC) or government agency and talk about how you can apply for government grants and get buyers or investors. We'll also have someone who's going to tell us war stories from the front lines of being an entrepreneur. I think this encourages and inspires all of us to believe we could do that ourselves.

You've also brought in Everard Mascarenhas to advise MedTech start-ups, and Josh Reiss to help with aspiring AI and Computing spin-outs. Can you tell me more about their roles and where they fit in?

The entrepreneurs in residence serve as mentors to academics wanting to start companies. If you don't know how to take your idea forward and commercialise it, one of our entrepreneurs in residence can advise you. They are successful entrepreneurs and can advise on the different routes that can be followed.

Both of them have run start-up companies themselves. They are people who can guide academics who maybe don't have any experience through the process, encourage them, and help them to get going.

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INTERVIEW

Can you tell me more about the new Queen Mary Enterprise Fund, how does it work?

We take money that has been realised through share sales [from previous investments] and licencing revenue and reinvest that money in start-ups. This allows entrepreneurs to leverage grants from government, win its first customers or contracts, or even attract venture capital investment. It's a way of helping a company at the very, very early stage.

Often, when you're starting a company, you can't get the first bit of money you need to get going. We make investments into these companies.

Does the university take an equity stake in the companies it helps establish?

Yes. One of the hot topics at the beginning of any start-up company is how much of a stake the university is going to have. This depends on how much help we give. If an academic manages to do it all without much of the investment, [the university] takes a small stake; if they aren't that interested in doing it themselves and want us to put more effort in, then the university can take a bigger share.

Does the university have an exit strategy for the stakes? Or are these long term holds?

One of the sources of funding for the Innovation Fund is share sales. We sell shares and then put that back into other businesses. If the company is doing very well, we might rely on dividends. Obviously, we'd like to do well financially but the objective is that the research we do at the university is used for the benefit of society. The fund is all part of our function of taking the research we do, and trying to use it to help people make the world a better place.

How important are small business incubators like QMB for supporting innovation and inspiring the next generation of innovators and entrepreneurs?

I think it's very important for [technology] start-ups to have access to certain facilities, labs, computer facilities, and the like. It may also be difficult to rent office space, because you may need to commit to a long-term lease with a landlord. An incubator can help solve these problems.

Start-ups need to be able to access specialised laboratories at reasonable rates, without having to buy the equipment for themselves. Some are available in the UK, and having good access to them and maybe even subsidising the use of advanced facilities is all very useful.

Having infrastructure in place that allows people to do the innovation without having to find the capital behind it is important.

Should there be closer ties between the public and private sector when it comes to harnessing innovation?

The public sector, including UKRI and Innovate UK, tends to be quite bureaucratic, which makes them more difficult to deal with than the private sector, which in some ways is more brutal but is clearer.

I think we could see more private sector involvement in public sector projects. There can also be structured procurement, whereby the bulk of anything procured by the Govt can be bought from a large overseas supplier, but a fraction of what is needed must be procured within the local economy. That could really help.

Public money, which is taxpayers' money, has to be used wisely. But I think there could be a bit more of it. And obviously, when one reads about burning £2 billion worth of PPE that was incorrectly ordered, or you see some of the contracting that went on around the procurement of PPE, as an entrepreneur it's very disappointing that it's so difficult to get your hands on money for doing research and innovation in a small business.

MGI Tech, Illumina reach agreement in UK sequencing IP Lawsuit, enabling launch of HotMPS chemistry and sequencing by BGI UK

MGI Tech, an affiliate of QMB tenant BGI, has reached a court-approved agreement with Illumina in its patent lawsuit in the UK, enabling the company to make its HotMPS sequencing chemistry and instruments commercially available in the UK, as of July 6.

MGI is a leading producer of clinical high-throughput gene sequencers, and its multi-omics platforms include genetic sequencing, medical imaging, and laboratory automation. Its vision is to lead life science innovation.

According to the Shenzhen-based Chinese sequencing tech company, the sealed consent order pertains to the ongoing patent lawsuit between MGI and Illumina in the UK and was approved by The High Court of Justice Business and Property Courts of England and Wales on June 23.

As a result of the consent order, MGI said it is now *"free to begin to sell and supply HotMPS reagents and sequencers modified for use with HotMPS reagents exclusively in the UK."* According to the company, the first instruments are being made available to selected labs in the UK, including one at Imperial College London.

However, MGI noted that the HotMPS sequencing chemistry, which the company launched in April and showcased at the European Society of Human Genetics annual meeting last month, can only be used with DNBSeq-G400RS and DNBSeq-G400 instruments whose software has been configured for HotMPS.

"DNBSeq-G400RS and DNBSeq-G400 whose software has been configured for HotMPS must be used in conjunction with MGI's HotMPS sequencing reagents, and must not be used with MGI's CoolMPS or StandardMPS reagents (or with any re-agents containing a 3'O-azidomethyl blocking group)," an MGI spokesperson wrote in an email.

"Use of MGI's CoolMPS or Standard MPS reagents (or with any reagents containing a 3'O-azidomethyl blocking group) with such sequencers will invalidate any warranty which may have been provided by MGI, and any liability for intellectual property infringement arising from the use of such reagents is excluded from any IP indemnity," the spokesperson said.

MGI has been offering the HotMPS chemistry and instruments in all but five European countries, which will now be joined by the UK. The company said it plans to launch other products in the UK, including library preparation kits to enable whole-genome, whole-exome, RNA, and metagenomics sequencing.

"We are very excited to extend our HotMPS sequencing offering to the UK market. Our established and proven DNBSeq technology offers a choice to the sequencing customers which we believe is essential to drive innovation. With our local UK team, we are ready to support customers immediately who have been waiting for this announcement," Yong Hou, president of MGI Europe and Africa, said in a statement.

BGI took the strategic decision to invest in the UK before the pandemic, in light of the country's global leadership in genomics and the life sciences. BGI started to establish a genomic sequencing laboratory in London in 2018, which is based on level 3 in the QMB Innovation Centre.

When the COVID-19 pandemic struck, BGI recognised the need to adapt and respond to the crisis and took the decision to use the laboratory for COVID-19 testing. With the world now beginning to recover from the pandemic, BGI will continue to develop its sequencing capacity in the UK.

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INTERVIEW


Professor Greg Slabaugh

DERI: Bridging the Digital Divide

Queen Mary University of London's new Digital Environment Research Institute (DERI) officially opened in March 2022 tasked with spearheading the university's research in digital and data science.

DERI is led by Greg Slabaugh, Professor of Computer Vision and AI at QMUL. His primary research interests include computer vision, deep learning, computational photography, medical image computing. QMB caught up with Greg to find out more about his vision for the new institute and to understand what he sees as the big challenges in the years ahead.

DERI officially launched on 24th March 2022, how is it going so far?

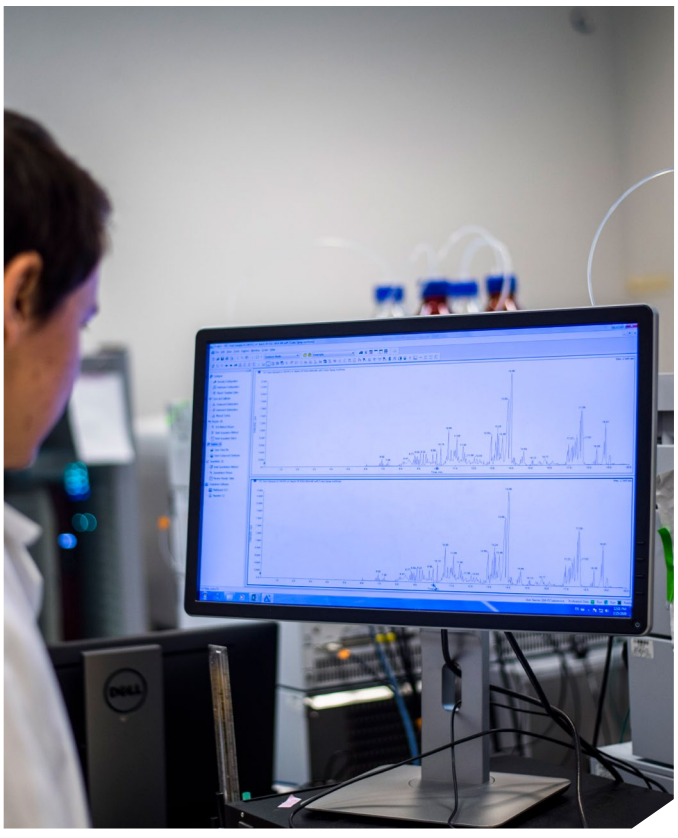
We are in the process of recruiting our very first DERI Professors who will shape and lead DERI's research strategy. We have also completed the setup of our brand new UKRI-funded "AI for Drug Discovery PhD Programme" in collaboration with Exscientia, MSD and Sosei Heptares and can't wait to welcome our first PhD students in September. We are always developing funding applications with QMUL academics across a broad range of areas and hopefully some of these bids will be successful. A good forum to start discussing ideas and to connect with other experts are our DERI seminars, which we hold every Thursday at 11:00am during term time, as well as sandpit and networking events throughout the year; the most recent one took place on June 16th and brought together 50 researchers from UCL and QMUL to pitch ideas for collaborative projects and activities.

Can you tell me more about how DERI is set up and how it harnesses the technological expertise and capability from across the university?

DERI is QMUL's first University Research Institute (URI) and, as such, we have the challenging task of shaping the URI model and paving the way for a handful of other URIs to come. We have a dedicated building as a physical hub for QMUL data scientists and AI experts to meet and we have an HPC cluster called Andrena which provides computing power to projects underpinned by machine learning.

How does DERI fit into the National AI Strategy released in 2021?

We discussed this extensively during our launch event in March, a recording of this discussion can be found here. In a few words, DERI can help address the UK's AI skills gap and, working with our partners, we can generate new knowledge in critical areas where data science and AI approaches can be true game changers such as in drug discovery.



What do you see as the greatest technological challenges of the 21st century?

There are several that I could mention here that present great opportunities for research. One is NetZero for which technology can play a critical role in reducing greenhouse gas emissions, carbon storage and precision agriculture for example. Another is computational biology; better understanding of genotypes and phenotypes can lead to precision medicine and longer healthier lives. A third is the digital environment itself – how to effectively blend the real and virtual worlds together through extended realities and robotics to augment human capability and experience.

What more can QMUL do to promote the founding principles of DERI?

DERI is still in the start-up phase, but thanks to dedicated funding from QMUL we are able to recruit Professors who will help us increase the institute's critical mass through direct staff recruitment and attract external collaborators. Increasing the size of DERI's seconded and permanent team is critical to promote and further develop DERI's founding principle of multidisciplinary collaboration, cutting across the siloes of traditional disciplines.

How does QMB fit into this vision?

By helping us to spread the word of DERI's mission to potential external collaborators and contributing to the design and delivery of DERI's Industry Alliance. We're happy for companies working in QMB to get involved with DERI, including giving talks in our weekly seminar and collaborating on grants involving digital and data science.

What else have you got planned for 2022?

Following the launch, we are looking to develop research themes in core areas including Trustworthy AI, Biomedicine and Healthcare, Financial Services and Technology, Games AI, and AI for the Environment and Sustainability. We're currently working on some large UKRI grant applications with our DERI fellows and other collaborators. We are also starting to shape plans for an Industry Alliance which we hope we can launch in 2023. The ultimate aim of this alliance is to deliver collaborative research projects with industry partners.

QMUL launches new business start-up Investment Fund

Queen Mary University of London (QMUL) has launched a new investment fund to help commercialise its world-class research and to support early-stage businesses spin-outs.

Called the Queen Mary Investment Fund (QMIF), the aim of the fund is to enable spin-outs to bridge the gap to venture capital seed investment. QMI, the university's technology transfer arm, works closely with the founders to assist them in building the venture and to meet the investment criteria of the fund.

The investment criteria include securing leveraged funding, plans to meet a seed investment milestone, and validation/ testimonials from potential seed investors.

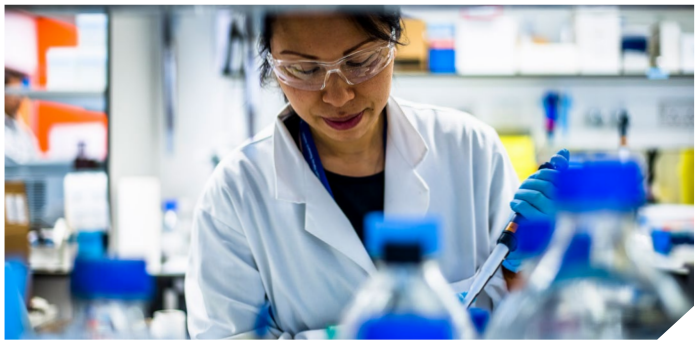
The fund's first investment is in Enterika Ltd, which is developing weight-loss products aimed at tackling obesity, which is a significant risk factor for a range of chronic diseases.

Enterika was successful with securing an Innovate UK grant to further develop the technology and has the support and interest from several investors.


Madusha Peiris

Madusha Peiris, the founder of Enterika and a lecturer and group leader at Barts and The London School of Medicine & Dentistry, said: *"Enterika is delighted to be the inaugural spinout supported by QMIF. Accessing such funding is critical during the early stages of fund raising as it provides matched funding support for research grants such as those from Innovate UK, while providing other investors with the confidence to co-invest,"*

Deborah Carter, Associate Commercialisation Director at QMI, said: *"We would like to congratulate Madusha Peiris and the team at Enterika on their achievements so far in securing the first investment from the fund."*




Dr Adam Daykin

Explaining why the investment fund was set up, Dr Adam Daykin, Associate Commercialisation Director at QMI said: *"QMI noticed an increasing number of early-stage ventures were finding it difficult to overcome a significant investment hurdle due to a misalignment of the requirements of investors, and the commercial readiness of the start-up."*

Adam added: *"As leverage funding is required to qualify for the fund, many grant schemes that support start-ups require matched funding and do not provide sufficient finance to advance the opportunity to a commercially relevant milestone. Our investment fund bridges that gap and we are excited to see our investment approach accelerate the formation of spin-out companies at QMUL and create a robust sustainable portfolio for the future."*


Sharon Ellis

Sharon Ellis, Director of Research, Enterprise & partnerships at Queen Mary University of London said *"Queen Mary's 2030 strategy is clear, we will embed entrepreneurship and innovation in our research culture. Our performance in national benchmarking exercises where we are in the top 10% in the Russell Group for working with business and top 20% for our IP commercialisation activities demonstrate this. But having the Investment Fund launched, to help colleagues succeed and accelerate their innovation is a critical milestone for us. We look forward to celebrating the success of Enterika but also many other entrepreneurial colleagues in the future."*

For more information on the Queen Mary Investment Fund (QMIF), or any support on commercialising research, please get in touch with QMI.

hVIVO working on world's first Omicron challenge model

Yamin 'Mo' Khan, CEO of Open Orphan

hVIVO, a QMB tenant and subsidiary of contract research organisation Open Orphan plc (AIM: ORPH), is developing the world's first human challenge model for the Omicron variant of Covid-19.

hVIVO plans to manufacture a new challenge agent (virus) based on the Omicron strain of SARS-CoV-2 which can be used to test the efficacy of vaccines and antiviral candidates. hVIVO aims to complete the manufacturing of the challenge agent by the fourth quarter of this year.

It then expects to conduct Omicron human challenge studies in 2023, after it receives regulatory approval and completes a characterisation study of the manufactured strain. The characterisation study will establish a dose of the Omicron challenge agent that will cause a safe and reliable infection in healthy volunteers.

hVIVO has signed an agreement with biotech company Vaxart Inc (NASDAQ: VXRT) to test its oral vaccine candidate in 2023.

"hVIVO's fight against the pandemic continues with the development of this new challenge agent. The benefits to Vaxart are immense, and we have already been contacted by a number of biopharma companies looking to test the efficacy of their products using this challenge virus," said Open Orphan CEO Yamin 'Mo' Khan.

Human challenge trials involve the deliberate exposure of human volunteers to infectious agents in a controlled setting. hVIVO specialises in these challenge trials to assess the efficacy of vaccines or treatments for clients and has a leading portfolio of models across respiratory syncytial virus (RSV), Influenza, COVID-19, human rhinovirus (hRV), Asthma and COPD, and Malaria.

Last year, hVIVO conducted the world's first Covid-19 human challenge trial in partnership with Imperial College London and the UK Government's Vaccine Taskforce at the Royal Free Hospital in London. The results of this pioneering study were published in Nature Medicine in March 2022.

Khan believes the results of that trial gave customers the confidence to move forward with an Omicron challenge model, which is *"less severe yet more infective"*.

The upcoming characterisation study will give a dose of the Omicron challenge agent to a group of healthy volunteers. hVIVO said these men and women will have been previously vaccinated against or infected with Covid-19, with no known risk factors for severe symptoms.

Vaxart Chief Medical Officer Dr James Cummings said a human challenge study involving the Vaxart's oral vaccine against the Omicron variant is the *"most rapid and direct way"* to test its effectiveness.

"The results of this study will inform the next steps in the development of our Covid-19 vaccine candidate, which has the potential to transform personal and public health approaches to controlling the global pandemic," Cummings added.

Open Orphan is a specialist contract research organisation that tests vaccines and antivirals through human challenge clinical trials. hVIVO recruits many of its volunteers for its challenge study clinical trials through its dedicated volunteer recruitment website, www.flucamp.com.

hVIVO sign £14.7m influenza contract

In June, hVIVO signed a contract with an existing client - a top five global pharmaceutical firm – to conduct an influenza characterisation study and a follow-on influenza human challenge study.

The news followed a challenge agent (virus) manufacturing contract signed with the same client in May 2022. Virus manufacturing activities for this contract have already commenced and are expected to be completed by the end of Q3 2022.

The characterisation study, which is sponsored by hVIVO, will identify a dose of the flu challenge agent that causes a safe and reliable infection in healthy volunteers. It is expected to start in Q3 2022, subject to the relevant regulatory approvals, and will enrol volunteers recruited from the Company's clinical trial volunteer recruitment arm known as FluCamp.

Following completion of the characterisation study, hVIVO will conduct a human challenge study, expected to commence in Q1 2023. The study will enable the Company to determine the efficacy of a number of different vaccine candidates for the reduction in incidence of symptomatic flu infection and disease severity in healthy volunteers. This will help select which of the candidates to progress further into later stage clinical trials.

The manufacture of new challenge viruses ensures that hVIVO has contemporary challenge agents available to meet the needs of the global pharmaceutical industry, therefore allowing the company to expand its offering of human challenge studies, especially among infectious diseases where variants continually emerge and are often poorly understood, the firm noted.

Yamin 'Mo' Khan, CEO of Open Orphan, said: *"This is another important milestone for hVIVO in that, in addition to the previously announced manufacture of a bespoke challenge agent, we have now been contracted to conduct the characterisation and the challenge studies with this big pharma customer. We will also be providing full recruitment and lab services."*

He added: *"This highlights hVIVO's unique full-service offering in running complex human challenge studies. Our team has a long history of manufacturing challenge agents and conducting human challenge studies. In regard to challenge studies our experience is unrivalled, our scientific expertise unmatched, and our operational delivery in a class of its own."*

'UK must act swiftly to fend off competition if it wants to **build the world's leading life sciences hub**'

The UK must act quickly to fend off competition if it wants to build the world's leading life sciences hub, a new report suggests.

A year on from the launch of the government's life science vision, the report, commissioned by the Association of the British Pharmaceutical Industry, said although achieving the ambition remained feasible, the UK would need an attractive business environment because its competitor countries were becoming more adept at attracting investment.

To achieve the ambition of the vision, the PwC-produced report suggested raising pharmaceutical R&D investment in the UK to build a 'stronger manufacturing and research infrastructure', alongside better investment in, access to and uptake of innovative medicines.

It said the UK would also need to adopt a renewed approach to the priority healthcare challenges identified in the government's 'Life Science Vision', which would mean cutting the overall burden on health of dementia, cancer, cardiovascular and respiratory disease and mental health.

The report, which was launched today at the ABPI's annual conference, maps the UK's performance on 13 key performance indicators across a range of areas including R&D, manufacturing, and access to new medicines.

It ranks the UK against a number of comparator countries: Belgium, Canada, China, France, Germany, Italy, Japan, Norway, Singapore, Spain, Sweden, Switzerland and the US. These were chosen *"based on those which are also in the race to become the leading global hub for life sciences."*

The report quantified the size of the prize if the vision was implemented in full and the UK could emulate the successes of leading EU countries, which included:

- £68 billion in additional GDP over 30 years, owing to increased R&D investment
- £16.3 billion additional annual GDP from increased pharmaceutical exports
- Supporting 85,000 additional jobs
- Up to 40 per cent decrease in disease burden across the whole UK – for areas like cardiovascular disease, mental health conditions and Cancer.
- Reduced variation in speed of access to new medicines within three months of licensing for all NHS patients.

One of the key areas that need to be urgently addressed is clinical research, where the UK's *"once-leading position on clinical trials is in relative decline,"* according to the report. The number of Phase I trials initiated in the UK fell by 14% a year between 2015 and 2019, and Phase II and III trials fell by 3% and 2% respectively.

"The pandemic has exacerbated this downward trend, with the number of Phase II and Phase III trials falling by 18% and 22% respectively in 2020," it says.

At the same time, the decline in the UK's share of global pharmaceutical R&D activity has led to the loss of an average of £3.2bn in R&D spending each year for the past eight years.

In 2020, pharmaceutical R&D spending at global level topped £154bn, of which the UK's share was £5bn. This amounted to just over 3.2% of global pharmaceutical R&D, and while this was a rise of 0.7 percentage points from 2019, the report suggests this was *"likely driven from additional pandemic-related R&D investment."*

Meanwhile, other countries in Europe have increased their productivity, the report says. In 2015, the UK's pharmaceutical manufacturing sector had a higher GVA per employee than that of Germany, Spain and Italy.

Richard Torbett, chief executive of the ABPI, said: *"The report shows the opportunities that investment in life sciences can bring to UK patients, the NHS and the economy. Global competition is fiercer than ever, and the UK is struggling to keep pace with competitors like France and Germany. By prioritising this sector, building strong research and manufacturing bases and creating policies to improve access to medicines for patients we can be a world leader in ten years. We know government shares this ambition and we urge them to work with us to fulfil the UK's potential."*

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NEWS

Queen Mary university of London opens additional incubation space with **Queen Mary University Enterprise Zone**

QME (Queen Mary University Enterprise Zone) opened its doors last March, providing hot desk, co-working and individual offices within the Innovation Centre.

The new innovation space offers business development support and infrastructure to help early-stage Digital Health, Med-Tech and AI companies to grow and develop.

Tenants also benefit from access to networking events and workshops, and partnership and collaborative opportunities with QMUL.

Some of the current tenants include Queen Mary spinout company Nemisindo, which offers sound design services based on innovative procedural audio technology; Sanguinis, which provides technical, clinical and logistical support for blood component applications; Queen Mary spin-out company Kinomica Ltd, a pioneering precision medicine research and diagnostics company specialising in cell signalling with patented, interdisciplinary phosphoproteomics platform, KScan®; and Safety Wings Ltd, a healthcare tech company which utilises AI to build systems that will allow their members to access first class healthcare options wherever they are in the world.

"QME provided much-needed innovation space and we are delighted to support early-stage start-ups and entrepreneurs to make their ideas a commercial reality," said Sheryl Malloy, the Community Manager overseeing the running of the Queen Mary University Enterprise Zone.

Queen Mary University of London (QMUL) was awarded £1.5 million to expand its life science incubation space in 2020 as part of a £20 million investment into 20 University Enterprise Zones (UEZs) by Research England, which is part of UK Research and Innovation.

Nas Hornett, QMB's Operations Manager, added: "QME is a welcome addition to the QMB Innovation Centre, which is one of the largest and most successful bio-incubators in London, and demonstrates our ongoing commitment to promoting research and innovation in what is a growing Life Sciences cluster in east London."

For more information, please contact Sheryl Malloy: www.qmenterprisezone.com/contact-us/#booktour

PLEASE CONTACT OUR MANAGEMENT TEAM WITH ANY FEEDBACK OR NEWS STORY IDEAS:

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