QMB Innovation Centre

QUEEN MARY BIOENTERPRISES

H2 2022

Discovery

NEWS, VIEWS AND EVENTS AT QMB

IN THIS ISSUE

EDITOR'S WELCOME

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

In this issue we met up with Professors Claudia Langenberg and Mark Caulfield, who are heavily involved in setting up the Precision Healthcare University Research Institute (PHURI) here in Whitechapel, together with QMB tenant and gene sequencing company BGI, who are also involved.

The institute will revolutionise precision healthcare in East London and build on the powerful partnership between Queen Mary University of London and Barts NHS Trust to help build a stronger health service for the people of East London, the UK and around the world through innovative patient-focused research in diverse communities.

In other news, we speak to Dr Phil Clare, the recently appointed chief executive of Queen Mary Innovation on his vision for commercialising the university's world-class research, and how the university wants to support early-stage spin-out businesses from across the university's ecosystem.

We also hear from hVIVO, which has recently announced positive results from a peer-reviewed study evaluating the in-vitro efficacy of FLU-v, and Meta Materials, which has just been granted two new U.S. patents for second and third generation nanoporous ceramic battery separators.

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.

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QMB welcomes new gene therapy research tenant **AviadoBio**

QMB recently welcomed a new tenant in the form of AviadoBio, which is conducting research into treating patients living with some of the most life-threatening neurodegenerative disorders through gene therapy.

AviadoBio specialises in researching and developing potential new treatments for two extremely debilitating diseases: Frontotemporal Dementia (FTD) and Amyotrophic Lateral Sclerosis (ALS). FTD is one of most common forms of dementia in individuals under the age of 65 after Alzheimer's disease. ALS is more commonly known as Motor Neurone Disease (MND), or Lou Gehrig's disease, which is a devastating neurodegenerative disorder characterised by the degeneration of upper and lower motor neurons in the brain and spinal cord. ALS is the most common adult motor neuron disease, with more than 15,000 patients diagnosed with ALS every year in the US and EU.

Professor Chris Shaw

AviadoBio currently has 16 scientists working at QMB. The company was co-founded by Dr Youn Bok Lee, who is the Head of Discovery, and Dr Do Young Lee, who is Head of Vector Science, together with Professor Chris Shaw who is Chief Scientific and Clinical Advisor, and a Director of the Maurice Wohl Clinical Neuroscience Institute and Centre Director of the UK Dementia Research Institute at King's College.

Dr Youn Bok Lee and Dr Do Young Lee were friends at university in South Korea before they both worked together at University College London. And when Dr Youn Bok Lee subsequently went to work at Kings College, he met Prof Chris Shaw and the idea of a new company was born.

Dr Youn Bok Lee

Dr Do Young Lee

For Dr Do Young Lee, working in gene therapy has been something of a personal mission after her father was diagnosed with MND in 2006. She saw first-hand the debilitating effects of the disease as well as the lack of effective treatments.

"I believe in gene therapy," says Dr Do Young Lee, who holds a dual degree BSc in Biological engineering and Clinical pathology, an MSc in Epidemiology from the Korea University and a PhD in Haematology from the Cancer institute in University College London.

She added: *"There is so much unmet clinical need for therapies to tackle neurodegenerative diseases, and with our background and passion for the subject, it seemed like a perfect way to explore how we can apply our research to meet this unmet need. Our neuroanatomy-led approach to viral vector distribution seeks to deliver our therapies to the right place to maximise their potential."*

For Dr Youn Bok Lee, his reasons for going in neuroscience and gene therapy are no less personal or inspirational. As the son of pig farmers in his native South Korea, Youn Bok became attuned to what ailed his family's pigs which led to a lifelong love of biology where he gained a BSc in Biology and MSc in Animal Physiology and Biochemistry from Dongguk University, South Korea, and a MSc and PhD in Molecule Neuroscience from University of Bristol.

Dr Youn Bok Lee said: *"Our gene therapies target the genetic drivers, modifiers, or pathways of monogenic and complex neurodegenerative diseases. ALS and FTD are thought to represent a broad neurodegenerative disease spectrum, displaying significant overlap in genetic drivers, disease mechanisms and pathologies, so it made sense to work on these two diseases together."*

QMB Interview
Precision Health University Research Institute (PHURI)


Professor Sir Mark Caulfield

Queen Mary University of London has set up a Precision Health University Research Institute (PHURI) in Whitechapel. The PHURI will revolutionise precision healthcare in East London, and drive research to better understand how disease impacts different patient groups.

The new cross-faculty institute builds on the powerful partnership between Queen Mary University of London and Barts NHS Trust and will help to build a stronger health service for the people of East London, the UK and the world, changing lives locally and globally through ambitious and innovative patient-focused research in diverse communities.

QMB caught up with Professor Claudia Langenberg, the newly appointed director of PHURI, Professor Sir Mark Caulfield, Vice Principal for Health, and Ryan Liu, General Manager at QMB tenant BGI UK, which is part of BGI Genomics, the world's leading provider of genomic sequencing and proteomic services.

What is the Precision Health University Research Institute (PHURI) and why is it so important that it be based in East London?

Prof Mark Caulfield (MC): PHURI is a multi-faculty agency for the delivery of novel diagnoses, novel interventions and new therapies. We will mobilise health data produced routinely in the Barts Health NHS Trust from across its five hospitals, covering 2.5 million people from 97 nations. We use that diversity to create a unique master data set of 2.3 million episodes of care a year. And we combine that with primary care data for 2.5 million people.

We have a unique data set from which we can make novel insights using artificial intelligence amongst other things, allowing us to march the findings into direct health care. Of course, that will also be accompanied by diagnostics, omics measurements, and imaging and digital pathology. Increasingly, patients will use remote sensing wearable devices to capture data.

If you combine those with the routinely collected health data we already have, then you create a virtual virtuous circle where you


Professor Claudia Langenberg

can create innovations either in med tech or in therapeutics, particularly advanced therapies that today we can't imagine because we're not using our health data in that way.

Prof Claudia Langenberg (CL): There is a huge unmet need [in East London] that PHURI wants to address. We are committed to studying populations who are underrepresented in biomedical research and clinical trials.

It's not just the scale and depth of data from our partner, Barts Health, it's the diversity of the patients the hospital serves and the diagnoses they present with. This allows us to answer questions and research diseases that you couldn't look at elsewhere and which matter locally and around the world.

What will the practical implications of an institute like PHURI be?

CL: It's the potential for discovery. In science, traditionally you start with a hypothesis, and you have to know what you want to measure. But a lot of what we have found out comes from being really systematic and looking at everything we can measure in order to prioritise only the most robust findings for follow-up.

That's what we mean by 'agnostic approaches' to discovery, in that you go in without a hypothesis, but look at all the data at scale. And that's also why I think it's really great that PHURI is situated within QMUL's Digital Environment Research Institute (DERI) which is focused on new methods to harness the wealth and depth of those data to identify the most informative things for, let's say, predicting the onset or course of a disease.

This way, we can gain insights into diseases we may not be expert at, so the collaboration with our clinical colleagues and experts is really important.

What's the scale of the timesaving in research?

CL: One example is where through our agnostic approach we identified a small molecule that drives a rare degenerative eye disease about not much was known. We had just identified the genetic basis of this molecule, so coincidentally it was really easy and fast to collaborate with the team working on the disease to do a 'synthetic experiment' that demonstrated that people with genetic susceptibility to having higher versus lower levels of this particular molecule had a different risk for the disease. Because of this and other work, there is now a supplementation trial ongoing. If you line up all the relevant data, these things can happen fast. If academics and industry are committed to sharing their data, examples like these can be done by a student in half a day, in theory. Even though such work cannot replace a trial, it can help to prioritise interventions for trials and save many years of work and expenditure, something that is really important given the high failure rate of trials.

Why is it so important to be based in East London?

CL: Here we can study population groups that traditionally haven't been represented in research. This means you can test whether the discoveries that are made in very European-centric populations are applicable or generalisable more broadly and the people in East London.

There are different ways of understanding precision healthcare, it doesn't have to mean 'individualised'. There is a clear need for targeting prevention and management better. But that doesn't have to mean that this is on an individual basis, it can mean targeting treatments to a group of people who share a joint disease mechanism and of course, there are already a lot of successful examples where our clinical colleagues are already doing exactly that.

So the impact of this could be truly global in terms of being able to develop treatments for people from around the world without having to set up expensive facilities in those in those countries?

MC: With 97 nations in East London, you've got a research window on a substantial section of the world. So we can do things in a high-income country that low-income countries can't conceive of doing. But those results may be no less generalisable to those communities in those countries.

And that, therefore, becomes one of the unique selling points of this development, which is about serving people from diverse communities which are largely underrepresented or underserved and researched.

CL: There is also an added advantage because it is important to be able to go back to patients. This is fundamentally easier if you study a large population that you serve with the local hospital. In other settings, bringing people back in for research or obtaining a sample is much harder. It is very important to build good relationships and trust with the patients you want to encourage to participate in research. This should not be taken for granted. This can also be easier if you study patients from the local area in the hospital, who you have hopefully already built a rapport with.

Queen Mary and Barts have created this important strategic partnership and we have already seen the potential value of working jointly with our east London community, with a view to improving outcomes for patients here and elsewhere.

How long do you think it will take you to get all four centres all up and running?

CL: Well, as the timeframe is 'as soon as possible', we are recruiting now. It depends on how quickly we can get people in post. But we're building this up from the start so it's really important that we get international leaders in for each centre, so that we can expand it and jointly make it a centre of excellence for precision healthcare research.

I'm also recruiting my own team. So there's a lot of things going on in parallel, but I know there is lots of interest, and we've spoken to many outstanding scientists from around the world already.

INTERVIEW

How many people will be employed by the end?

CL: The PHURI building will have space for several hundred people, so even if I do nothing but recruit for three years, that's going to be a big space to fill. But each of the centre leads will be bringing in their own teams, and then it'll snowball from that. This will be boosted by affiliating, just like DERI has done, the outstanding talent that's already across QMUL.

How much have you got to spend on this and how is it being funded?

MC: We have a total of £100 million, including the land that we have purchased in Whitechapel. The total site envelope allows 850,000 square feet of net internal usable space, including the Queen Mary Life Sciences Building, within which will be PHURI. That's between 120,000 and 150,000 square feet of building for us, which will be ready in three or more years depending on when we start doing it.

This site will be a giant academic industry NHS Life Sciences partnerships site with a new clinical research facility in the Royal London hospital. We're integrating that site and will provide anchor infrastructure for small medium enterprise that will be in the other buildings. There will also be extensive new laboratory space. All funding comes from QMUL. There is no UK government money and no private sector funding.

What is BGI's involvement in the Precision Healthcare University Research Institute project?

Ryan Liu, General Manager at BGI UK (RL): BGI is co-located at the Queen Mary Innovation Centre, which is adjacent to PHURI. As you've heard from Professor Caulfield and Professor Langenberg, PHURI is an extremely ambitious project, which will create a unique and internationally relevant life sciences research and innovation ecosystem in Whitechapel, east London.

The new PHURI will house parallel research platforms seeking breakthroughs in Uniquely Diverse Health Data and Analytics, Single Cell Analyses with Integrated Diagnostics, MedTech and Devices and Therapeutic Innovation. These platforms will be woven together to interlink patient genotypes and phenotypic expression through collection, curation and exploration of ubiquitous data with advanced therapies based on biological discoveries made through our single cell "totalomics".

How far back does BGI's relationship with Queen Mary University of London go?

RL: The partnership between BGI and Queen Mary dates back to 2018 and our shared vision "omics for all" brings exceptional potential for personalised treatments – a key mission for PHURI. Our agreement with Queen Mary provides research groups and healthcare vendors with access to fast and affordable genetic sequencing and wider analytical services that will complement the more specialised equipment that will be in PHURI. Our continued investments in analytical capability demonstrate our confidence in the potential for the Barts Life Sciences Cluster.

The new institute will be the beating heart of the wider life sciences development, bringing transformative research and innovation to the cluster. BGI shares this ambition to expand and grow this paradigm-changing life sciences research at Whitechapel.

How will you know it's been a success?

CL: I think, if we see examples of where our research has delivered what we promise in improving health outcomes for the local population with an influence internationally. That's what we're working towards. That's the goal.

If, in parallel, we're developing the local talent to fill the building and move to the next phase where we can do this really at scale, that would be success.

We have this unique opportunity and if we can pull this off that'll be my success.

MC: I would agree with that. What I'd hope is that in five years, as a result of this, there will be something in medicine that we would do completely differently. Either a new way of diagnosing a disease or a new way of treating a disease. And if that was in a diverse community, that would be an even better success.

Open Orphan changes name to hVIVO plc

Open Orphan plc, which acquired QMB tenant hVIVO back in January 2020, has changed its name to hVIVO plc.

The company said the name change reflects the company's core human challenge and early clinical services business where it has strong global brand recognition within the biopharma industry and beyond, as well as aligning the company more closely with its long and established heritage.

Along with news of the rebranding, hVIVO also reported its financial results for the first half of this year. The company reported £18.9m revenue for the first half of the year and reiterated its full-year revenue guidance of £50m, underpinned by "robust" trading in July and August and record contracted order book increased nearly threefold to £70m as at 30 June 2022.

hVIVO's CEO Yamin'Mo' Khan said that the group achieved double-digit earnings before interest, tax depreciation and amortisation for the first time, which has been a "key goal" of the business since its first full-year profitability last year.

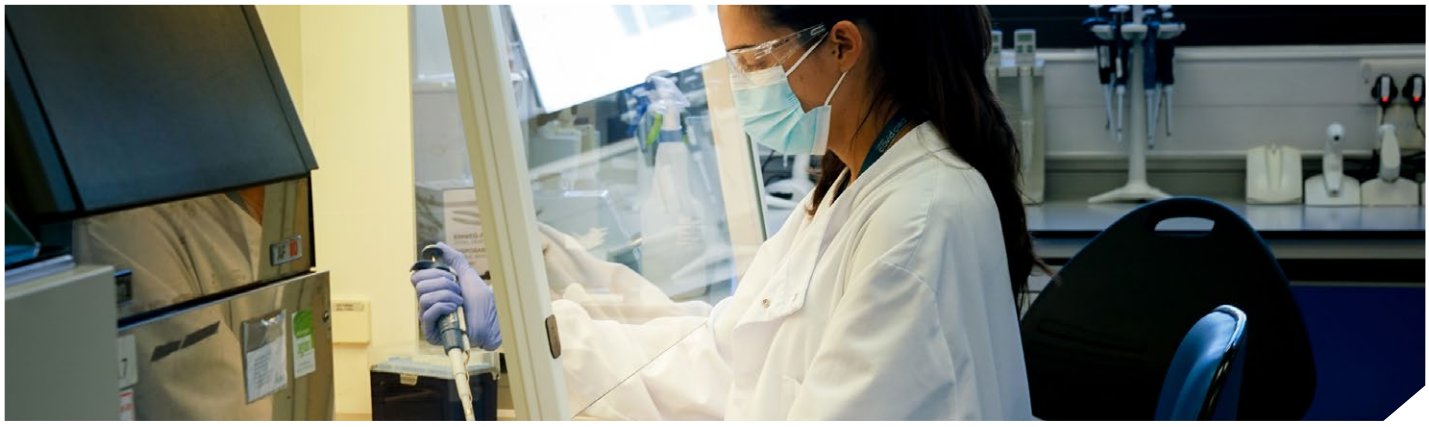
Mo said: *"In the second half, we expect revenues to grow considerably and profit margins to increase further as a number of significant contracts signed earlier in the year enter the clinic. The board expects to deliver full-year revenues in line with guidance, and we look forward to the rest of 2022 and beyond with confidence."*

In June, hVIVO said it was developing the world's first human challenge model involving the Omicron variant of Covid-19. This will be used to test the efficacy of an oral vaccine candidate from biotech company Vaxart. hVIVO developed the world's first COVID-19 human challenge model and conducted the worlds first COVID-19 challenge trial in 2021 in partnership with the UK Government, Imperial College London, and the Royal Free Hospital London.


Yamin'Mo' Khan

In August, hVIVO signed a £10.4m contract to develop a new influenza human challenge strain to test a major global pharmaceutical company's oral antiviral candidate. hVIVO has world-leading expertise in challenge agent manufacture, with the ability to manufacture specific subtypes of viruses, as well as unrivalled experience in conducting challenge studies. This bespoke end-to-end human challenge service is unique in the market.

In November, hVIVO signed a £13.6m contract with a US-based biopharmaceutical client to test its respiratory syncytial virus (RSV) antiviral candidate, using hVIVO's established RSV Human Challenge Study Model. With a surge of RSV taking over hospitals around the globe, hVIVO plays an important role in bringing effective vaccines and treatments to the market.



Positive in vitro results for FLU-v published in Vaccines

hVIVO recently announced positive data from a peer-reviewed study evaluating the in-vitro efficacy of FLU-v, Imutex Limited's broad spectrum influenza vaccine, has been published in the scientific journal Vaccines.

FLU-v is owned by Imutex, a joint venture between hVIVO and PepTcell Limited (the legal name of SEEK Group), to develop vaccines against influenza and mosquito borne diseases such as Zika virus, malaria and other flaviviruses.

Previous clinical studies have demonstrated that FLU-v induced increased antibody and cellular responses in vivo. This placebo-controlled study evaluated the ability of FLU-v to induce cellular effector functions and cross-reactivity (both measures of the immune response, with cross-reactivity being particularly important for protection against multiple viral strains) of immune cells extracted from participants, following exposure to five different influenza strains.

The study found that measurements of IFN-γ and granzyme B production in stimulated immune cells from participants that had been previously vaccinated with either FLU-v or placebo, were significantly higher in the FLU-v group both when stimulated with vaccine antigen and also with antigens from a panel of seasonal and pandemic inactivated influenza A and B strains. These results further support the continued development of FLU-v as a broad-spectrum influenza vaccine.

Seasonal influenza causes significant morbidity and mortality each year and a pandemic influenza continues to pose a worldwide threat. Influenza is a serious global health threat with an estimated 1 billion cases per year, 3-5 million severe cases and 290,000-650,000 deaths per year.

Dr Andrew Catchpole

Dr Andrew Catchpole, Chief Scientific Officer of hVIVO, said: *"It is encouraging to see further positive data for FLU-v, supporting its continued development as a broad-spectrum influenza vaccine. There is a large unmet need for a broad-spectrum vaccine to help battle emerging seasonal and pandemic influenza A and B viruses. Although FLU-v has already produced successful Phase II clinical data, this in vitro study is particularly important as it showed the ability of the candidate to induce an immune response against a diverse variety of influenza A and B strains."*

Meta Materials Granted Two New U.S. Patents for Next-Generation Battery Separators

Meta Materials Inc., the parent company of QMB tenant Mediwise, which has just taken the top floor of our QME building, has been granted two new U.S. patents for second and third generation nanoporous ceramic battery separators.

Including new patent filings, and the patent portfolio acquired with its acquisition of Optodot, META now has 472 active patent documents, including 292 issued patents and 180 pending patent applications. META's patent portfolio comprises 112 patent families, of which 63 include at least one issued patent.

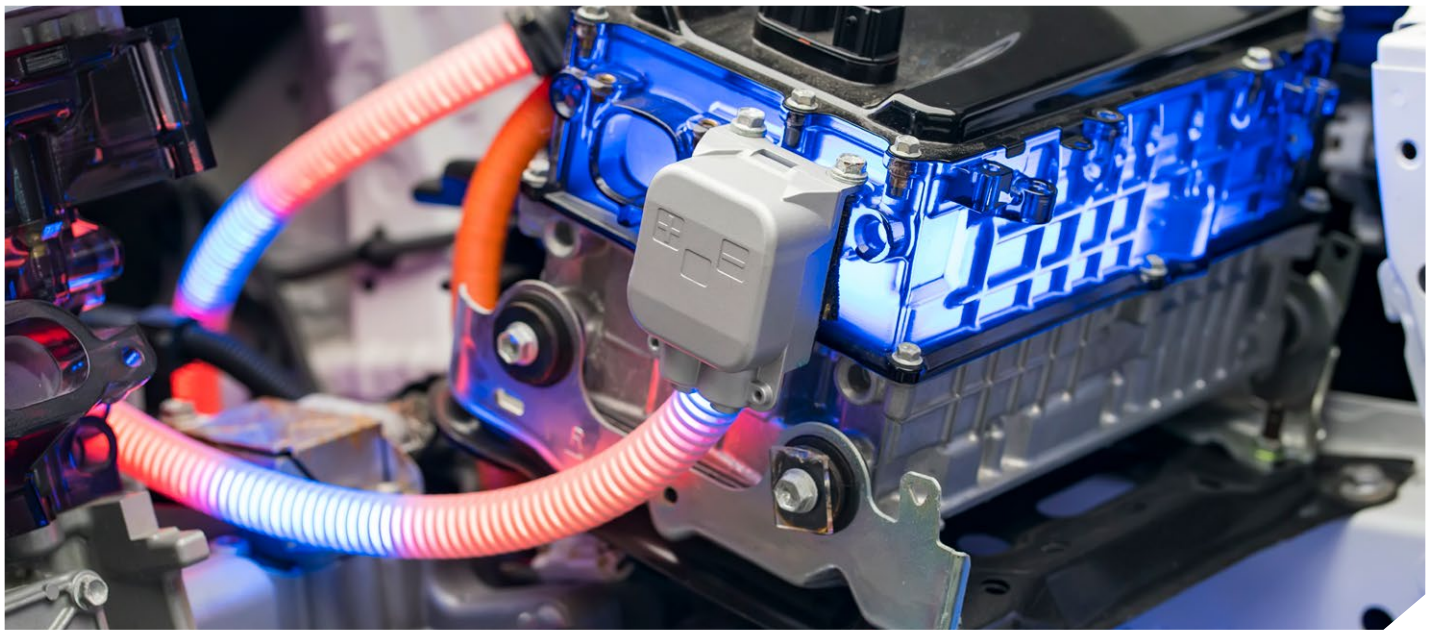
"These newly granted U.S. patents are directed to our second-generation NPORE® nanoporous ceramic separator, offering superior safety for lithium-ion batteries, and third generation NPORE® ECS (electrode coated separator), which is designed to reduce the cost of manufacturing while improving battery safety, lifetime, energy, and power density," said Dr. Steve Carlson, Executive Vice President, Advanced Materials and Battery Products at META.

Carlson added: *"Together, these unique products are designed to address the key challenges facing the electric vehicle industry."*

US Patent No. 11,387,521, issued July 12, 2022, is directed to an advanced nanoporous separator for lithium-ion batteries while US Patent No. 11,387,523, also issued on July 12, is directed to a new generation lithium-ion battery in which the cathode is directly coated onto the separator. This technology reduces the complexity and expense of the equipment used to fabricate the battery, for flat and prismatic batteries that can be used, for example, in electric vehicles. This US patent also enables alternative manufacturing processes, such as where a non-dried, wet cathode is applied to the separator.

According to Yano Research Institute Ltd., the global market for Lithium-ion battery separators was an estimated $5.1 billion in 2021 and is projected to reach $9.0 billion in 2025).

SNE Research estimates that separator shipments were about 5.5 billion square meters in 2021 and are projected to reach 15.9 billion square meters in 2025. About 15 million m2 are required per GWh of battery capacity (10-20 million m2, depending on the battery configuration).



DuPont Teijin Films and Mitsubishi Electric Europe partner with Meta Materials to advance safer, more efficient Li-Ion Batteries

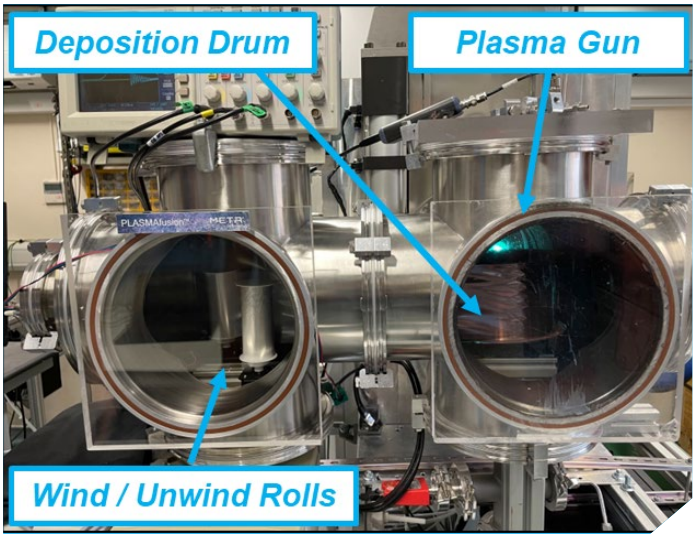
Meta Materials Inc. has entered into a Memorandum of Understanding (MOU) in partnership with DuPont Teijin Films and Mitsubishi Electric Europe.

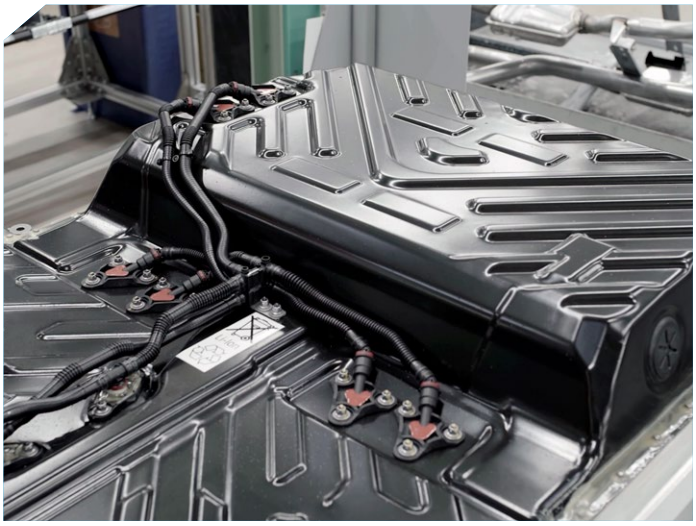
Using META's PLASMAfusion®, the parties plan to scale a proprietary, high volume, roll-to-roll manufacturing system for film-based, coated copper current collectors.

The film-based products will reduce battery weight and cost, improve energy efficiency, extend vehicle range, and enhance safety against the risk of battery fires (known as thermal runaway) compared to standard Li-Ion batteries for electric vehicles and other use cases.

"Current Li-Ion battery innovations focus mainly on extending battery range and life span. With today's climate crisis and the increased demand for Electric Vehicles, a next generation Li-Ion battery is required that is more sustainable and safer," said George Palikaras, META's President and CEO.

George added: *"We are excited to form a strategic alliance with Dupont Teijin Films and Mitsubishi Electric Europe focused on scaling PLASMAfusion® in a proprietary high volume battery coating system that can reduce copper volume and provide superior functionality, reduced cost, and improved battery safety."*





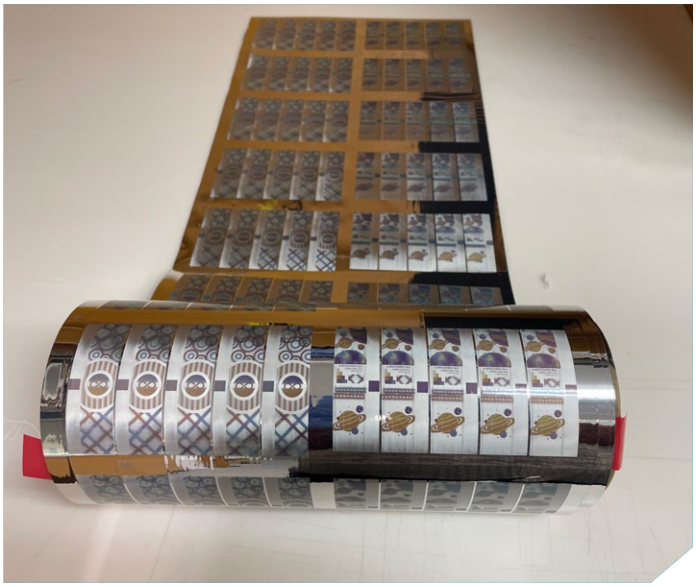
The MOU is focused on developing battery materials, such as coated copper current collectors and solid-state battery electrodes, as a multi-year project in several stages: a pilot-scale roll-to-roll system, to be followed by an industrial scale mass production line, and further development of the application to the production of solid-state batteries. META will contribute the PLASMAfusion® technology platform, system development and independent testing of finished cells; DuPont Teijin Films will develop and supply the polyester substrates, and Mitsubishi Electric Europe will contribute automation technology, expertise, and interface to machine builders.

According to an S&P Global Future of Copper report, the world may face a shortfall of between 1.6 and 9.9 million tons of copper by 2035. Even under an optimistic scenario, supply would not meet the copper demand required for net-zero emissions by 2050.

An electronic vehicle (EV) requires 2.5 times more copper than an ICE vehicle and the forecasted supply shortage needs a better solution than more mining. Current collectors used on the cathode and anode are made from aluminium and copper foils, respectively, and together contribute about 15% of the weight of the battery cell; the heavier copper material accounts more than 10%.

Meta Materials Receives $4.3 Million in Purchase Orders

Meta Materials Inc. has been awarded US$4.3 million in purchase orders for its nano-optic security business, which provides anti-counterfeiting features for currencies and government documents and authentication for brands.



META has been executing an agreement with a maximum value of US$41.5 million over a period of up to five years with a confidential G10 central bank customer. The new purchase orders represent a base award for continued work under the multi-year agreement. The customer may elect to increase the scope of the base award with additional purchase orders.

"META is committed to being a global leader in banknote security technology. Our nano-optic technology addresses a growing, multi-billion-dollar problem by delivering next generation solutions that can be applied to protect banknotes and government documents and provide authentication for brands," said George Palikaras, President and CEO.

George added: *"We are proud that our key customer continues to validate our progress with additional funding, and we are committed to continuing to advance the program."*

According to a 2019 OECD report on Trends in Trade in Counterfeit and Pirated Goods, the total value of imported fake goods worldwide was about US$509 billion, or 3.3% of global trade, up from 2.5% in 2013. Despite the worldwide pandemic, the Security Printing Market is valued at US$29.8 billion and growing at a compound annual growth rate (CAGR) of over 4.5% during 2021 - 2026 (Source: Research and Markets report).

META's KolourOptik® technology uses award winning optical nanomaterials (also known as "plasmonic metamaterials") that combine multi-directional movement, 3D stereo-depth, high resolution, and multiple colours. KolourOptik® delivers unique visual effects that create a next level of security and visual engagement while enhancing the theme of the overall banknote.

SNE Research estimates that separator shipments were about 5.5 billion square meters in 2021 and are projected to reach 15.9 billion square meters in 2025. About 15 million m2 are required per GWh of battery capacity (10-20 million m2, depending on the battery configuration).

QMUL Appoints **Dr Phil Clare as CEO of Queen Mary Innovation**

Queen Mary University of London (QMUL) have appointed Dr Phil Clare as Chief Executive of Queen Mary Innovation Ltd (QMI), the wholly owned technology transfer company responsible for the commercialisation and management of the university's intellectual property and portfolio of spinout companies.

Taking a lead in Queen Mary's innovation landscape, Phil and his team are tasked with uncovering commercial gems and potentially sustainable innovation projects from across the university's broader ecosystem, which includes everything from life sciences and engineering to the human sciences.

Phil said: *"We need to invest to grow the team and then work with all of the leading researchers from across the university. We need to meet the needs of our colleagues in the humanities and social sciences to find sustainable models to make sure their research has an impact, as well as commercialising technologies and innovations for scientists, engineers and clinicians in order to make a real difference to our global economy and society, taking our researchers' innovations from Whitechapel to the world."*

When it comes to the commercialisation of intellectual property, Phil believes positive social impact is just as important as the profit motive, if not more so.

"What we do is not just about creating profits, it's not just about making money, it's also very much about sustainability and social impact. We need to recognise the entrepreneurial spirit across the whole university and reach out to people to hear their ideas. It's about growing the ecosystem in which we sit," said Dr Clare.

Some of the companies QMI has spun-out from QMUL include Keratify, a patented technology designed by skin scientists to improve current skin testing practices; Nemisindo, a technology created by Queen Mary's Entrepreneur in Residence Professor Josh Reiss, which generates sounds using physics models, for use instead of samples; Dragonfly, an automatic saliency detection company (with revenues growing rapidly at more than £1m per annum); and hViVo, the world leader in testing infectious and respiratory disease products using human challenge study models, which developed the world's first COVID-19 challenge study model.

A chemist by training, Phil was previously the Director of Innovation & Engagement at the University of Oxford, where he worked closely with Oxford University Innovation, Oxford Science Enterprises and other partners to develop the innovation ecosystem in Oxford. His many achievements there include helping to agree the license for the Oxford-AstraZeneca vaccine. More than 3 billion doses of the vaccine have been supplied to 183 countries worldwide, saving many millions of lives.

QMI Chief Executive Dr Phil Clare
(Credit: Innovation Oxford by Ian Wallman)

"I was but one person in a cast of thousands, but what we achieved in such a short space of time shows what can be achieved if we all pull in the same direction," he says, referring to the Oxford-AstraZeneca vaccine.

Dr Clare was also Chair of PraxisAuril, the UK professional association for Knowledge Exchange Practitioners and is now an ambassador for them. He is a registered technology transfer professional (RTTP), and a Member of the Institute of Directors (MIoD).

Queen Mary has grown from strength to strength in knowledge exchange – the sharing of knowledge, ideas and experience with the community, business, and public and third sectors. In the second Knowledge Exchange Framework (KEF2), Queen Mary has been ranked among the top 20% of English universities in the categories public and community engagement, research partnerships, and IP and commercialisation, and has made strong progress in the categories of working with business and working with the public and third sector.

"We've got a fantastic physical space here at QME in the QMB building, based within the broader Life Sciences District in Whitechapel. From here we can really drive the social value of what we do, not just for the university, but for the wider community too," said Dr Clare.

QMUL spin-off provides the blueprint for **new game-changing AI applications**

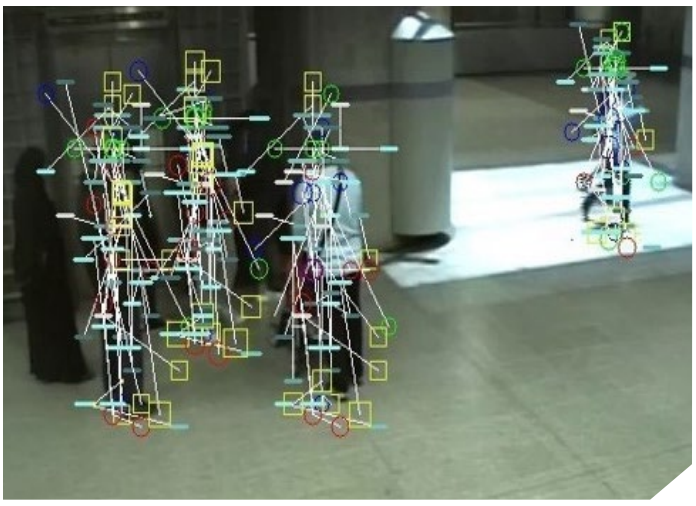
Queen Mary spin-off company Vision Semantics Ltd (VSL) has sold its video recognition technology and related intellectual property to Veritone Inc., a US-based artificial intelligence tech company.

The acquisition forms part of Veritone's new solution, Tracker, which is an AI-powered object video recognition product based on VSL's technology.

Veritone Tracker leverages AI to track objects through video recognition software without having to perform facial recognition or other biometric identification that would reveal a person's identity.

Vision Semantics was founded by Sean Gong, Professor of Visual Computation at Queen Mary University of London, in 2007. The technology builds on his decades of pioneering research to develop systems that can be used to track and identify public space activities of people and vehicles. VSL is internationally renowned for its technology for Person Re-Identification (RE-ID), a privacy preserving computer vision technology for public safety and security applications.

Person RE-ID is the mechanism to find a person at different locations over different times in a vast quantity of video data collected from distributed cameras. It does this without using facial imagery features or any other physical characteristics. RE-ID is unique compared to other biometric-based approaches, such as facial recognition, where multiple images are required for every individual to be matched.



Professor Gong's research is already being used to aid security and crime prevention, as AI-based RE-ID systems enable searching for people when facial recognition is not possible. This might be because of poor lighting, low-resolution imagery, or the subject looking away from view.

The technology also allows users to identify people much more quickly compared to previous technologies. It has been commercialised and applied in different continents, even helping to solve a $32M criminal theft case in the US and a murder case in Australia.

Commenting, Professor Sean Gong said: *"We are excited to join Veritone, a leading AI platform provider. Our new relationship will provide exciting opportunities and new challenges. We share its vision that ethical AI can build a better world, advance the quality of everyday life, and help with meeting the challenges for a safer, more responsible, and cleaner society."*


Dr Adam Daykin

Dr Adam Daykin, Associate Commercialisation Director at QMI, added: *"We are absolutely delighted for Sean and everything he has achieved to date. Sean's technology is a real game changer given concerns around privacy and maintaining the integrity of personally identifiable information when using AI. This sale to Veritone Inc. shows that what we do really has global resonance."*

UK Shadow Minister for Science, Research & Innovation visits QMB


Chi Onwurah

QMB recently welcomed Chi Onwurah, the Shadow Minister for Science, Research & Innovation, to the facility to see how the university and its tenants are delivering projects that have local, national, and global significance.

Labour MP Chi Onwurah met with Professor Andrew Livingston, the University's Vice-Principal for Research and Innovation and was briefed about the University's plans for research and innovation on the new Life Sciences campus at Whitechapel.

Chi also met gene therapy specialists and new QMB tenant AviadoBio to hear from Professor Chris Shaw, the company's co-founder and Chief Scientific and Clinical Advisor, as well as CEO Lisa Deschamps, and Graeme Fielder the COO. The AviadoBio senior team explained to Chi Onwurah about how the incubation space and their links with Queen Mary help them grow.

At the meeting, Professor Livingston highlighted a number of innovative and collaborative projects they university is involved with including the Precision Health University Research Institute (PHURI) which is working to revolutionise precision healthcare from East London, as well as supporting STEM skills through a partnership with Newham College and a wide range of employers on the London City Institute of Technology (LCIOT),

And the launch of the Faculty of Science and Engineering's Centre for Academic Inclusion in Science and Engineering (CAISE), a virtual centre to promote inclusive education as part of the Queen Mary Curriculum Development Strategic Project.

Professor Andrew Livingston said: *"It was a great pleasure to welcome Chi, giving us all the opportunity to connect about the ways our University works with others to discover, create and innovate. Our mission is to generate new knowledge, challenge existing knowledge, drive economic growth and engage with others for the public good to create a better world. Sharing this mission with politicians is important as it's our view that government policies to support and drive innovation are vital for the future of the UK economy and the university sector."*

Chi Onwurah MP added: *"It was fantastic to visit Queen Mary's BioEnterprises Innovation Centre and learn about their work across campus to build a local engine of innovation in the heart of East London. It was good to hear about their rigorous focus on diversity and inclusion, and the steps they are taking to foster innovation and encourage and support spins outs, as well as increasing the social mobility of low-income students."*


Professor Andrew Livingston

UK investment in R&D plunges in blow to **'science superpower'** plan

Britain's plan to become a post-Brexit "science and technology superpower" has suffered a significant setback after a fall in research and development investment of almost a fifth since 2014, according to a report.

The Institute for Public Policy Research said the UK's share of global investment in R&D projects – including in health and life sciences – had fallen sharply from 4.2% eight years ago to 3.4% in 2019 immediately before the Covid pandemic struck.

The decline comes despite successive prime ministers talking up investment as a central plank of their growth strategies, from David Cameron promoting life sciences as the "jewel in the crown" of the British economy to Boris Johnson's push for the country to be a post-Brexit "science superpower".

Rishi Sunak pledged this year, during his time as chancellor, to boost public and private sector investment in R&D as a central way to increase the productivity of the British economy.

The UK ranks 11th in the Organisation for Economic Co-operation and Development group of wealthy nations for total R&D investment as a percentage of GDP, well behind comparable rich countries such as the US, Austria and Switzerland.

The IPPR said that, had the UK's 2014 share of global R&D investment been maintained, it would have been £18bn – or 26% – higher in 2019.

According to the centre-left thinktank, Britain would need to invest an additional £62bn this year from public and private sources to match Israel, the global leader for R&D expenditure.

The UK's lacklustre performance in maintaining its ranking for investment in science, technology and innovation comes despite successive cuts in the headline rate of corporation tax, which were designed to encourage companies to invest in Britain.

Business investment has also faltered since the 2016 Brexit vote amid heightened political and economic uncertainty facing companies. Investment fell further during the Covid pandemic, and is still 8% below where it was before the health emergency struck.

Speculation is mounting before next month's autumn statement that Jeremy Hunt, the chancellor, could cut the government's R&D budget as part of efforts to find savings after the disastrous mini-budget.

The government had set a target for total R&D investment – from public and private sources – to reach 2.4% of GDP by 2027. Total expenditure by the state and companies investing in research in Britain was £38.5bn in 2019, or about 1.7% of GDP.

Warning against cuts to public sector investment, the IPPR report found that state investment fuelled private sector investment. It said that if the government invested an additional £1bn in R&D, private sector investors would contribute an extra £1.4bn over 10 years.

It said if ministers wanted to pursue a growth agenda, investing in health sciences would be significantly more effective than reducing corporation tax. No sector invests more in R&D globally than life sciences.

Shreya Nanda

Shreya Nanda, an IPPR economist and the report's author, said: *"There has been a managed decline in the UK over the past decade – a decline in our economy, our health and our resilience.*

"R&D innovation is a vital lever in responding to this decline. We urge the government to increase R&D funding to restore the UK's leading global position, encourage private sector investment and ultimately deliver economic growth."

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

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