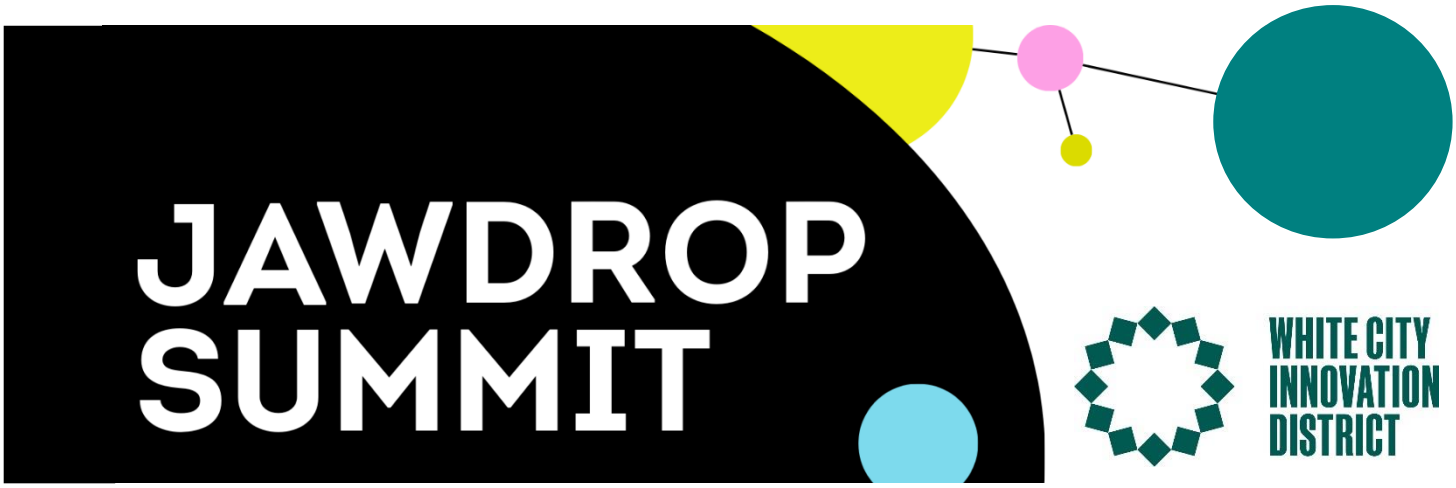

Panel 1: Hardwiring collaboration into Life Sciences in White City

Prema Gurunathan

Good afternoon. I am Prema, Managing Director of Upstream, which is a partnership between the London Borough of Hammersmith and Fulham and Imperial College London. And on behalf of Upstream and our fellow partners at Imperial's Chemistry Department and Enterprise Division, I'd like to welcome you all to the inaugural JawDrop Summit: breathing life into the life sciences.

This summit grew out of the Deep Tech Network that Upstream, and its partners started back in 2019. In fact, I think I see a lot of familiar faces in the audience, some people who have launched it all those years ago as well. And our program today gives us the opportunity to further those discussions and connections made at the regular meetings.

Today, we're going to be covering collaboration, A.I. and investing in the life sciences, and this day would not be possible without the support of our sponsors Mitsui Fudosan UK, the PRC, the IBC and Imperial Business Partners.

We hope you enjoy the day. And now for the first keynote from Professor Mary Ryan: Mary is the Vice Provost for Research and Enterprise and the Armourers and Brasiers' Chair for Materials Science at Imperial. She leads a large interdisciplinary group focused on understanding nanoscale materials and nanoscale interfaces and spans applications from biosensors right up to field cells and more.

Mary is also a champion for support and investment in the deep tech sector. I think that's all I need to say.

Mary, over to you.

Prof. Mary Ryan (Imperial Vice-Provost, Research and Enterprise)

Well, thank you for that very kind introduction. It's been said before, we all sound better on paper, but it's really, really great to be here.

I'm the vice Provost for Research & Enterprise, I've been in this role for about half a year, and Oscar might disagree with me, but I think I have the best job in the College because I really get to not just see, but help understand how we can pull the levers to really help us do even better research and really take that research towards the benefit of society, which is core to our college mission.

And of course, what we are building here - and White City is really a key example of that commitment to not just brilliant science but delivering real world impact.

So, it's my absolute privilege to welcome you to the inaugural Jaw Drop summit. I don't know who came up

with the title, but it is an amazing name and actually, by the end of the day, I expect you will

all be walking out and with an appropriate jaw drop because the work that has been going on has already been amazing. And I think you're going to hear some really stimulating and exciting discussions. The program is fabulous. What we're doing today and beyond today is bringing together really a whole range of stakeholders in academia, industry, local government to address some of the key challenges we have in life sciences, challenges that require multiple stakeholder approach to really help us make a difference.

We are here because of one particular stakeholder, because of the amazing partnership Imperial College has built with the Local Council, and I'm really pleased that Council is here to sit on the panel and really help us think about our place as a university in the local ecosystem, delivering locally as well as nationally and globally. So, thank you for your ongoing support and for joining us today.

The Imperial Campus, I think it's fair to say, is the anchor of this new science and tech community. And we appreciate that it is both an honour and a privilege, but also a responsibility that we as an Imperial community commit our best minds and our best efforts to making this work and doing what we can, not to just for the benefit of Imperial, but for the benefit of London and the country.

This summit we mentioned came out of the Deep Tech Network, and we've been really thinking quite hard about what deep tech means as a statement, and what it means for us as a community to enable deep tech.

We've recently launched the Institute for Deep Tech Entrepreneurship, aligned with a lot of the ambitions of the network to really not just support some of these world changing technologies that come from long timeframe, high risk, big ideas, but also thinking about what are the experiments on innovation? How do we learn? What's the best way to support and enable that?

So, it's using this campus a little bit like a test bed itself, right? Like an experiment in co-location and collaboration to really think about what's the best way that Imperial and the white city innovation district and what the to deliver on those new technologies. We're going to have a lot I think about it today.

I'm really excited about that panel. And I think what's really exciting about the kind of emergence of what's happening on this campus is how it's bringing in new disciplines that are both, I think, orthogonal: so, we are getting some kind of pushing into discipline parity in this space, but also where there are deep connections that already exist and can be deepened.

And so, thinking about how we bring in the Imperial AI community to the I-HUB building, and in that space, we are really bringing from across the College our best thinkers in AI as applied to different sectors. We're really focusing on how AI can benefit different technologies in different sectors.

We're also have our Institute for Security, Science and Technology and the new Native Defence Innovation Accelerator is going to be housed there and thinking about actually how all these different sectors and all these different disciplines are going to come together from the College and the District’s perspective to drive health and prosperity locally and beyond.
This is the inaugural Summit and I'm excited that means there's going to be many more to come. And I think by the end of the day, people are probably already going to be saying, when is the next one?

And it's interesting when you say something is inaugural, because we're not just starting. There's been a huge amount of work that's gone on, I think, building this community. And I really want to thank the Upstream team for delivering this and Oscar and his team have been a huge champion of that. But we're starting today, I think, with a new ambition to do even more and deliver even more.

I will stop there and just again; I want to really encourage participation. The whole point I think, of the Innovation District is how we get that spirit of partnership and collaboration and that we are all part of this journey. So, everyone here should also feel part of this conversation today.

And I'm looking forward to hearing not just from the panellists but from the broader community, your thoughts on how we better deliver in this innovation space. So, it's my pleasure now to hand over to our next speaker, Lord James Bethell, who we are very honoured to have you here. You've been driving the life science strategy and innovation, life science in government, launching the life science vision, which is this ten-year vision for the sector.

And I think really the government has put science and technology at the forefront of lots of its policies. And I think life science in particular has been at the heart of that drive, and it has a really well articulated vision in how it can support that. The Why City Innovation District I think is a brilliant - and I'm slightly biased - but a brilliant exemplar of how the life science vision can be exemplified. Thank you.

Prof. Oscar Ces (Head of Chemistry Department, Imperial College London)

Welcome. When we set this up that we really hoped it will attract attention. It's fantastic to see such a broad cross-section of people from the White City ecosystem and beyond that, which really is kind of fantastic.

And we've got a great set of discussions ahead today. For this first one, we've got illustrious leaders from industry, from the trade organisations, from local government. What we're looking to do in this first session is to look at how we have hardwired collaboration in white city, what's special about it, what we think the future holds.

As I said, we want this to be a really interactive session. What we've got at the beginning is two questions we want to throw to the panel.

Okay, so the first question for the day we're asking the panellists is **what is special about the White City Innovation District and how the organisation have collaborated here and how they're seeking to collaborate in the future.**

Now before handing over, I might just say a few words from the point of view of how the area has changed. You know, it really has. If you had come here five years, ten years ago, you'd think it is actually unrecognisable and that investment in infrastructure and equipment is breath-taking.

But for me, that is not the magic sauce of what makes this place special. The thing that for me has become very special is the people who live within these buildings, the stakeholder community, and how it's come together to be an extremely collaborative ecosystem. Now, to understand what I mean by that, when we came here in 2018 roughly, we had a real vision with the College about an ecosystem that would co-locate academia, industry, enterprise and beyond.

Now that's a great catch phrase, but lots of science parks say that and on the ground the reality is quite different. There are silos between different parts of organisations, and we really were determined to break down those barriers and redefine how industry and academia could work together.

And when you spend time together on a daily basis, what happens that is really special is that nearly every stakeholder on campus knows what everyone else's future roadmap is, what their needs are in terms of talent, in terms of infrastructure, in terms of equipment.

There's a shared ownership of what the vision for the White City Innovation ecosystem is moving forward.

There's a real kind of sense of a neighbourhood and frankly, it changed our DNA as a University.

What I mean by that is that if you look at what the universities tend to do, the focal point initiatives
Then the next level of priority tends to be SMEs, whose genesis is the university: a staff start-up, a student start-up.

And then a distant third has in the past tended to be SMEs, which don't have a link to the university, and the limit is often its only bandwidth: there are only so many things you can give them. Also, traditional University ways of working are not often aligned with the speed at which SMEs operate.

So, when we came here a few years ago, two years before we landed on this site, we asked SMEs what do you need from us? And the question was: operate nimbly, lead innovation frameworks, give us access to your capital infrastructure. You have equipment we don't have, access to talent and we really look very closely at that.

And I think in the first two years of our journey we changed.

For instance, in this building (MSRH) at any one time, 30% of equipment is being used by people who are not based in the building: local SMEs, Corporate Partners, the medical campus. We can set up contracts now in days which would easily have taken it weeks, months, a couple of years.

So those barriers that prevented collaboration, we tried to knock them down.

And I think I always joke and say when we came here initially it was a bit like the Wild West.
I'm not sure College knew what we were doing, which is a good thing. So, we'd often try things out and then say: “You know the traditional way of working? We could do it differently.”, and colleagues bought into that.

Now, as other years have passed that spirit has percolated through. But it's a two-way thing. When I reach out to somebody, those people at White City Place and what David Hyde or Richard Broyd at Scale Space, if I need space or need a favour, they always collaborate. That spirit of helping out is just as much in my direction as us pushing out with the university.
And we have an example of that today. This is a very busy event. We suddenly needed extra space for 200 people, and when I contacted Scale Space within an hour it was set up. That level of collaboration, that is really special and enabling.

So, when you add to that the fact, we have amazing R&D, major expertise and talent, I think there are set ups we have here which we don't find in concert elsewhere in the world. So as Mary said, we are really proud to anchor that.

And with that, I'll hand over to our first panellist: Stephen can we get to your thoughts on what you think makes the District so special.

Councillor Stephen Cowan (Leader, Hammersmith & Fulham Council)

I start off with a quote of there's a book called “No Ordinary Disruption: The Four Global Forces Breaking All the Trends” and one of the quotes from this book by Richard Dobbs, James Manyika, and Jonathan Woetzel is compared to the Industrial Revolution, this change happening ten times
faster, 300 times of scale or 3000 times the impact. And that's talking about everything that's going on in STEM at the moment.

Now, if you look in 2018, 2021, South Korea led the world in the blooming Bloomberg Innovation Index.

Germany is fourth. The EU has six of the top ten countries in the index and Britain is 18th. And yet we have some of the best innovation by all academic institutions anywhere in the world.

So when we came into office in 2014, we had developed and I was we were lucky enough to have a professor of economic geography as our cabinet member in the local borough for the economies - now the Vice-Chancellor of Brunel- but we had a very firm view that the laissez faire sort of consensus that had existed wasn't quite in keeping with what was going on with the most innovative economies around the world.

If you look at South Korea, who set out to develop ten innovation cities, it was a combination of state intervention with private sector business and with academic institutions. And we pitched that to Alice Gast (*then President of Imperial College London*) when we met her that we wanted to build a new Kendall Square. We wanted to turn White City into a global economic hotspot in science, tech, engineering, maths, medicine, and media. And to our surprise, she pitched us back almost the same vision.

So, it was a very much a meeting of cultural values of what we thought White City could be, and that's what we said. “Build it.” That's what she said.

Since then, we've delivered thousands of thousands of square metres of genuinely affordable, flexible office space to start-up and scale up entrepreneurs. And we have attracted many anchor institutions, many sitting on this panel, but recently NATO as well. And we have had 60 life science start-ups or scale-ups move to White City.

And the idea is that we create a centre of gravity where excellence happens, which is, by the way, how every economic hotspot around the world ever grew since the Industrial Revolution, if we can nudge that and facilitate that, we can take the model of a German lender where local government has a responsibility of “getting the garden right, so flowers will grow.”

We figured that we could become the new Silicon Valley of the 21st century, and it is really a tribute to Imperial and to all the entrepreneurs, to everyone in this room, that now we have the greatest amounts of business investment in West London compared to all of West London put together.
Now that is a stark figure. Look at the size of Hammersmith and Fulham and look at the size of the other boroughs. They are huge, so to have more than them put together is a signal of what happens when you set off with intent and with government facilitation.

What we did with our Industrial Strategy partnership with Imperial College is we changed the planning rules to facilitate affordable, flexible office space. We brought in Blenheim Chalcott who are able to invest and support businesses. We've just twinned with “Barcelona 22”, Barcelona’s Innovation District and are looking to form a global innovation network so that we can share the best ideas with other liberal democracies and make sure that we are where the economic growth happens.

I agree that we need to be optimistic. It is alarming that many in the life sciences are putting up the danger flag at the moment, and we should listen to the experts at the front line.
But I think what we need to have in our hearts and what we need to have in our imaginations is the view that what's happened here, the economic ecosystem we've built here, is a model for a great British Renaissance and not just in the Golden Triangle of Oxford, Cambridge, and London, but we can spread it around Britain with the same type of intervention.

And if we are going to try and shape the 21st century and live up to our message, which is
“Tomorrow is made here” what we have to do is work in a much more muscular way as we've seen in Barcelona to make sure that Britain dominates these sectors, because every single business has been given the right type of support to make them thrive and therefore to lock in our economic strength for the rest of

the coming decades.

Over to Chris: Autolus has been located here for quite a while. What are your thoughts about that?

Dr Chris Williams (SVP, Corporate Development, Autolus)

Thanks. So, Oscar says we were one of the first two biotech companies to move here. We were founded in 2014 out of University College London. And at that time, we were looking for a site with two main criteria. We needed to be close to our founders and have access to that innovation and expertise that we needed to thrive and grow from.

And we also needed space to grow, there's nowhere in central London, UCL doesn't have anywhere on campus and all the small incubator hubs were too small. We looked at Stevenage. We didn't want to move out of London because we didn't want to lose that core innovation that we had within the company that was going to be the engine of the early days of the company.

We chanced upon the Imperial building out the scheme. It was it was a project of polystyrene projects on the order desk in, in the imperial offices. And they said, we've got Forest House, which is a small building that was demolished at the end of last year, just across the road there.

And we went for it. We were able to secure a lease on one floor with the option to expand onto the second floor of the building, and they provided us exactly what we needed here in central London. All of our already existing talent could commute here as it was as easy as the previous commute to University College London and there was space to grow.

So fast forward seven years – that will be eight years in September. We're now a company that's around 400 employees. We have our head office now in MediaWorks, White City Place. So, Imperial's not our landlord anymore, but the old BBC buildings are an extension of the imperial kind of a biotech hub. And we also have sites in Stevenage and in Maryland.

In the US we have a late phase drug for the treatment of acute lymphoblastic leukaemia that we hope to file for registration the end of this year.
So, we have been able to grow in this space from a small building on the Imperial campus, to now occupying a top floor of one of the big buildings across the road and our steppingstone was a space in the I-HUB building.

Now as we expanded, but the space wasn't ready across the main road and Imperial have been hugely supportive. Along the way we collaborated with Imperial. We use imperial services for in vivo work as we build our capability in-house.

Oscar Ces
You make an interesting point about the lab space as well, because I think one thing, we've seen in White City is that as companies grow organically from 1-2 employees to 3-400 employees, you don’t need to leave the area, the system will catch you. There aren’t many places that cater for that growth both in terms of price and size, in one place.

Chris Williams
The last thing you want to do is have to relocate into a different area of the UK to grow your company because you're just going to lose the momentum and the retention of staff. And White City has provided growth space for us over this seven-year period.

Let’s move to Avacta, who moved to the District just last year. Fiona, what is your perspective?

Dr Fiona McLaughlin (Chief Scientific Officer, Avacta)

Well, we've got quite a different story from Chris. Avacta has been around for a number of years, in 2015 as therapeutics business but many years before then as a diagnostics business up in Wetherby in the north of England. And when I joined the company, the therapeutics headquarters was in Cambridge, but it wasn't quite in Cambridge, it wasn't on the Park.

I've spent a lot of my life in Cambridge and it's not an easy city to get around. So being a mile away from Park is an issue. And I love Cambridge, but I could see that that site wasn't going to be future proofed for us. So, we looked around Cambridge and as everyone knows, Cambridge is absolutely filled because AstraZeneca didn't move out from all the buildings to build a new building.

In the end we came to London, and we looked around King’s Cross because we thought that was a good compromise for the guys based in Cambridge. But there was really nothing of the right size for us. The buildings there were either too small or too large or the wrong end of Kings Cross where you don't really want to be walking home on a dark evening.

So, we came down to Scale Space with my colleague Neil Bell, who used to work with Autolus and knew the area. We met Michael Holmes (CEO of Scale Space), and it was the end of a long day, and we really wanted to go home rather than come down to the city. But then we got to the top floor of Scale Space: I don't know if anyone's been in the building, but it’s fantastic.

It is a really light great space, you know, many of us who have spent years in labs, we end up in the basement with no light. But it wasn't just about the light: you could just see the opportunity that was there.

Firstly, because it was designed as an incubator space. So, we thought we would just take the majority of that floor, and our next-door neighbours is Puraffinity.

And one of the points I was going to mention, is that in Scale Space is not just biotech, it's media and high tech and communications. One of the things that I absolutely love about it is that you meet people that you wouldn't meet if you were in a science park, which is primarily therapeutic businesses. Here you might be interacting with people you wouldn't have met in any other form.

And then the other thing is all the marketing and community building activity around Scale Space. It's a fantastic place to be to meet people: there are events after work almost every night of the week, if you want to use the space for board meetings you can: we're hosting a science tea in a few weeks’ time. It's a great place. You come to our labs, and you feel …it's a destination.

So many people from Oxford come and have tours and they were really wanting to build something like that, but they can't because of the College system and, you know, Colleges wanting the land and not wanting to give back space. So, for me that is a huge benefit being in London.

Back to the story of how we came here, we did we did what other people didn't think of is we moved from Cambridge to London. We brought a lot of staff with us. But what we're also doing here is building up the team and recruiting from here is actually relatively easy. I think it's a fantastic time to be a young researcher looking for a job.

There are lots of opportunities that we are finding. I think what I see is that the life sciences are absolutely thriving in the UK, and I think the triangle is still a big part of where we are.

I think we do have to build that critical mass like you have in Kendall Square you have in San Francisco. I think that should be important because people need to know they can move from one company to another to another without needing to move house every time.

And having access to tube links is really beneficial and particularly in these times. So, it is quite easy to get here for most parts of London, especially from the West.

Oscar Ces

Some fantastic points Fiona, that resonate with me in particular. The fact that although it has a very strong life sciences presence, White City is a mix of other kind of companies.

I mean, the first company that I met when I came here was ClusterMarket, and at that point I was sort already committed to giving companies outside the department access to our equipment. That sounds great, but how do you actually facilitate that logistically? Well, having a ClusterMarket, some kind of "Airbnb of scientific equipment" was really helpful as they basically collaborated with us to deploy the software in the building and kind of overnight, we solved a problem that wasn't easy to fix.

The other point you made about talent: we now have graduates who are coming to want to study in our Department because they know that in their final year they will be here in White City in an ecosystem where they can find employment really quickly and you know, the undergraduate level has doubled since we came here.

Steve, we'd love to hear your point of view as an outsider. What are life science companies looking for in the UK, and how does a District meet or not meet their needs?

Steve Bates OBE (CEO, BioIndustry Association)

So, thanks very much.

And Oscar, I think of this 200 people in Scale Space watching this event remotely as well, the fact that there's an overflow to this event. So, I get to do these sorts of panels all around the world. And the reason I know we are now competing with China is we've got a room with 200 people in it somewhere else, because that's what you find in China. The scale is just that big. It's the first time I've come to a UK event with a 200 people in a spill-over room! So, we're on the global stage and we're doing the right thing.

So, the big the BioIndustry Association is not an outsider, we support the sector across the UK, and some of the stuff that we advocate for and hopefully have got is of real use to the people here, whether that be the opportunity to get the support of Innovate grants, whether it's the R&D tax credits, whether it's the chance to network and engage and hopefully some of the "banging on the drum" we do for the sector on the national stage and with the government, to keep it high profile.

So yeah, so why is this a great place? Well, I think what you've got here is you've got a place that is small enough to be networked but packs a punch big enough to be noticed on the global stage.

Before I came, I actually read a paper from Imperial, from Aldo Faisal who's actually here today! And about using AI in a clinical trial environment to monitor the progression of rare diseases.

And what was really intriguing about that was how you bring together the creativity of AI, plus new developments in clinical trials. So, it's this intersection that makes the difference.

And what I thought was really interesting is what we need to do is get that into a regulated environment so that it makes a real difference.

Now, where do you do that?

Because the UK is a small scene, I ping that to June Raine, who runs the MHRA, and I say “June, you know I phoned you up about MRNA and you didn't know what it was, and then it became quite important? We need to do the same for this sort of stuff and we can get it going fast here because we have got those things that are happening the deep science, but we've also got the translation capability, we've got the regulatory capability and then the global players that are in the audience that can take that on. I think that that's what gets it going. And I'm really excited to be here.

Oscar Ces
But in terms of making sure we all do better on the global stage in the UK. What do you think is missing?

Steve Bates
I think there's not enough people who’ve got millions of pounds to invest in life sciences in the UK.

That's number one capital at a rate and a pace to be able to deploy against this. Now, we've got to be nice to the people in the City. We got to be nice to people around the world. There are people who can do this. That's one of the things we've not got.

One of the other things that makes an ecosystem is relationships on all different levels. They can be professional relationships, they can be personal relationships, they can be historic relationships. Me and Steve Cowan, we got friends in common from 20 years ago. Part of what makes an ecosystem sticky is deep relationships. They could be on a whole host of scales. I encourage you to deepen those relationships of any nature. Any nature whatsoever. It's almost a collaborative and friendly, even competitive relationships can be quite good sometimes because you get going through the day, and into the evening. **That is what makes an ecosystem a buzz**. And I think there's lots of people here who definitely look like they're worth being in relationships with!

Stephen Cowan
It was quite interesting having examples like Area 22 in Barcelona. Two things are different to the UK.
The first is the local authority has a much more muscular approach to land development. So, for example, 20 years ago they had no universities in their innovation district, now they've got 10. And part of that was they were able to make the land only for universities and then give that land at very low price to the universities. And that therefore brought the cluster in that now makes them a global player. So, the first thing is development.

The second thing is to invest in the businesses, as Steve touched upon, because in Barcelona it's the city, often, or it's the regional governments who are taking a slice in return for very cheap or very low office space.

What we've done in Hammersmith and Fulham is set up Upstream because we wanted to make sure that businesses didn't go bust, by giving all that regular support. We changed our planning rules to give people affordable, flexible office space, and we're even changing our housing policies to try and prioritise who we house locally and build things for Novartis or Autolus, for people to live here.

We create coffee shops or bar or restaurant moments where people just meet, connect and maybe start a business or maybe just collaborate in some other way.

This is what makes an ecosystem work. But I think the two things you'd want to have been a much more thoughtful approach to investment and what the role of the state is in facilitating that and making sure that that that long term economic growth can be picked out.

I don't think as a country we've really rounded on that, and they are elsewhere. They are in in South Korea, they are in Spain, they are in Germany and indeed they are in many of our global competitors.

Oscar Ces

The next question we did discuss before is how can the life sciences contribute to and benefit the kid in the local White City area, in London, or the UK more broadly? And within that, you know, consider economic growth and social mobility. So, in this case, I think I'll start by the reverse order and Steve, I'd like to start with you and what your thoughts on that. What lessons can we draw from other places?

Steve Bates

Well, the most important thing that makes a difference to society is that we've got to turn it from an idea into a real thing. I had the privilege of working on the UK Vaccine Task Force and it was an absolute privilege to be able to be a small part of a big team that developed something that fast too, to actually make a difference in a global pandemic. That's the ultimate goal that you can do with products from life sciences, and **we shouldn't forget that and getting things out in a way so that they actually become impactful is the goal.**

I think keeping your eyes on the prize is the most important thing because all the other benefits, which are the building of the business, the running of the team, the academic papers, the next piece of science comes as a result of going for those goals. And those goals have to be in the real world because that is where we are going to make the biggest change.

Fiona McLaughlin

For us as a as an oncology, biotech, **everything we do has to be tangible**, we are not here to do blue skies research. That's why we collaborate with academics: they are here to do the blue skies research, and then our job is to turn that into drug. And that was one of the main points that I had when I joined.

So, with Avacta everything we're doing is leading to a drug, if there's no drug, we shouldn't be working on it because we don't have time. We don't have time to wait. Both from a commercial point of view, in terms of patent life, and from a patient point of view, in terms of getting drugs to patients. **Everything we do has to be in very high pace, and we have to make decisions all the time about the projects we work on and what we say.**

So, I think getting drugs to patients is our main focus and we have seen new drug in phase one. And going back to the first point of our interaction, it's really easy to meet people face to face when you're here and you have either partners flying into Heathrow, which is great to get to, or people who are based in South London coming across to see us. The possibility to pop in to meet you rather than spend the whole day getting somewhere further afield is much better.

One the main thing is the delivery to patients. And then the second thing is actually the local community. So, we are really keen to train young people in science. It's recognising that not everyone needs to do a degree and not everyone needs to do a Ph.D. depending on what you want to do.

One of the things we're doing is talking to Harrow Colleges to do apprenticeship schemes - as getting hold of good lab technicians, as I'm sure many people know, is really difficult.

People either want to go straight into the lab and go to university or do work in the City and earn lots of

money. They don't want to do those kind of slightly more laborious tasks, so we're doing that through an apprenticeship scheme. And we also have two industrial placement students, one of whom is actually from Imperial, and I mean, I did that when I was a student a long time ago, and that's a really important thing because for me that was actually when I thought "this is what I want
to do with the rest of my life."

I think giving people a taste of what industry feels like is really important because then you're ready to say, "This is what I want to do" or you think "I want to do blue skies research and I know this isn't the place for me."

So, we're doing that: it's been a year now with two students lined up for next year, and they're absolutely excellent.

If you pick students from a good university hit the ground running, they don't take up lots of your time to train them. **And I think that's something we can give back. Is actually giving local people an opportunity to come and spend a year**. We do work placements as well, not too many, and I think that's really important to give something back.

Oscar Ces
One of our biggest growth areas is actually students starting companies. And then you say that to me, I don't want to join Google, I want to start Google. And that's also where we see the changes from DG Tech into the life sciences. The fact that students can access lab space easily, that they are part of the driving force in the College, there's a consideration about how we support that.

Steve, over to you

Stephen Cowan
Correct, I love what Fiona said. We are in a sort of a Goldilocks zone and have a cycle of economic growth because you've got Heathrow here, the City in the West and we're just about to put one of Europe's biggest train stations in about half a mile away from here and give us superfast links up to Manchester and Birmingham, assuming high speed gets delivered quickly.

But it's transport links are definitely important because that's what allows the economic growth to spread. So, we are in a perfect place now. We have Imperial as a "golden ideas goose" laying all these different STEM industry eggs.

I think the question then is how do you make it inclusive as an economic ecosystem? Because we've all talked about the importance of having wealth generation, but for me, you know, as a Labour politician, I want to see it as an inclusive ecosystem, and I think our pitch to business is we would like to have a 20-year talent strategy. And that means, how do we get our children being born today to go to Imperial and to indeed be the next person that sets up a new version of Google in 20 years' time?

I can tell you now, I'm in my fifties – 20 years isn't very long at all.

So, if you look at the lesson in Germany, the German cities, states and Landers have a lot of ability to influence the curriculum of schools and to make sure it's aligned with their industry. If you're in Stuttgart, there's a very good chance you're going to get a job in some facet of the car industry.
And that's what we should be doing now in science, technology, engineering, maths, medicine and media, and that's what we're trying to do.

But because of the nature of the school ecosystem, we don't have direct influence. We've got to use our soft

power to encourage extracurricular activity in these areas. And that's something that our Industrial Strategy Board spends a lot of time talking about.

We've had apprenticeships come in and say: what can we do to get apprenticeships in these places and make them seamless and align them and make them even more effective? But I think we've got some way to go on that. And if there's something that locks us in permanently, it is actually how we align the education system.

So, we have a long-term plan and I know business is up for it because we've gone and seen businesses and I've made a point of not saying to business: "how are you going to help us take some people on?", what I've done is I've called and said "what do you want? What can we do to help?" And invariably they say talent management

So, I think it's coming at it from two separate ends, but **if Britain is to really seize the moment, you know, education, education, education, someone else once said, I think that's more relevant now in this sector.**

Chris Williams

To echo my fellow panellists' comments around talent: **it is great scientists that drive drug development, not great science. We have great science in the UK, but we need access to highly skilled individuals who have experience of taking a laboratory idea that comes from the university all the way through to a drug. Very few people have done that, and we need more of those people in the UK.**

A lot of them have had left and gone to the US, which is where all of the investment is. As Steve was alluding to earlier, if we can nurture and build talent locally, I think we've got a unique talent base in London, students interested in biotech and entrepreneurship looking to get into our industry, people looking to come to universities like Imperial and UCL and King's to exactly get into these industries because they are on our doorstep.

How can we build that talent pool and turn it into people who know how to develop drugs and drive new therapies all the way to market. **As a growing biotech, over the last seven years, access to talent has been the single biggest barrier**. As I said before, of the 400 people at Autolus about 100 of those are located in the US and they're hard-core drug development people.

That's where those people are, they're generally not so much in the UK – so I think whatever we can do to retain that talent over the long term, we should definitely pursue.

Q&A

Question1: is there an example that's come out of the White City Imperial hub that you can talk about, an example of success, maybe a company or something?

Oscar Ces

I mean, I can speak from my side of this, FreshCheck: they started to begin here. They were kind of student, and they have their own IP. They developed outside of their core kind of studies.
They went from the incubator which was 1 to 2 people to then take more space above and there's a myriad like that.

You've got Gamma Delta that came out of Kings that went straight into the MediaWorks facility. I don't know if they passed through the White city Imperial campus, but they came here because of the Imperial campus. They got acquired by Takeda last year. So, an exit, you know, a long-term view for that technology that came out of Kings and the Crick Institute.

And then the likes of DNA nudge, you know, so many examples.

Question 2
So, my question is about conflict of interest. The fact that translation, of course, is very important but is at the apex of the pyramid of research. How do you guys insulate research, pure thought from the agenda of industry? Who's moderating that and who's moderating the moderators?

Fiona McLaughlin
Maybe I could start. So, if everything that we do began its life with an academic. All of my career I have followed the course of cancer research. The key example obviously is that cancer research here in the UK is funded at least partly by Cancer Research UK. So, they're there with their tech transfer arm, which is now called cancer horizons, to look after their staff and protect their interests.

So, with every novel idea they will look for their licenses so that good industry would come in and license the technology, but it's also done in a way that there's milestones and royalties back to Cancer Research UK and that's how it's moderated in the oncology field.

Steve Bates
Can I, can I just remark that would be a really strange question to ask in America. They wouldn't understand the question in Boston. Many academics in Boston are academics part of the time and then they are they go off and run a business, then they come back in and do research part of the time. Part of the reason why Kendall Square, the area of Boston that was talked about, was so successful was because it was easy for academics to pop out and do it.

So, I think we should reflect that. That's a strange question in a global environment, point one. Point two, I don't think there is a conflict of interest. If you've got something that can go and make a difference in the world, I think there's a duty on an institution or group to get that to happen. And some people prefer to work in that space or do more in one place than another.

If you look at the purpose, I don't know very much about the setups of universities, but I look at UKRI being set up with academic funding through one set of streams and Innovate UK supporting businesses to grow another set of streams.

It's pretty obvious if you're doing a business, you do it through one way. If you're doing academic things, you do it through academic grants.

I think the quicker you turn things from being quasi academic into "let's turn this into a real business with a purpose and how we're going to get there" the better. Because then, you know, if you've got a molecule that is great, but you can't actually keep stable, you have to chuck it in the bin, however beautiful it was, because it just isn't going to work.

So, I think we should reflect on that. And if we're going to play at the global scene, we've got to understand that that's not the discussion that's had in China and that's not the discussion that's had in America.

Mary Ryan
We need to make sure we protect discovery science. And I think there's not there's not actually a conflict in doing both as I think academics come into it with curiosity. **You have to make sure that you enable curiosity-driven research at all times.** And we talked a little bit about the pipeline of talent. **You've also got to have the pipeline of ideas,** and if you don't invest in that very early-stage fundamental discovery science in 20 years' time, you don't have those ideas for translation.

Some people call discovery science “not-yet-applied science”, and I think it's my job in university to make sure that we have that balance of what discovery do we need, and how we protect it and enable it. And the research councils also make you do that.

But also, then “what is closer to application?”.

And I think it's not a conflict of interest, it's a balance. It's a balance of effort and resources between discovery and applied.

Oscar Ces
Yeah, I just would echo what Mary said. So, when we came here as a Department, we knew we'd be an ecosystem, that we would be surrounded by industry, but we were very strongly committed to making sure that the blue skies part of the department was just as vibrant, as strong because it then feeds downstream. So, there is for us an intention to do both things, and both are needed if we want to deliver impact.

I think that's a fantastic thing overall. But in terms of things like the younger generation, we have courses in “responsible research innovation”. So, what if they invent something? We say, look, if you commercialise it, this is what lies ahead. Think about how the public may perceive it. It is embedded into education as well.

So, it's something that's kind of at the forefront of what we think.

Question 3: My question is we talk a lot about collaborations and obviously you've all worked in collaborations for a long time. So, what are some of the things that you define as a successful collaboration and some of the challenges that you've encountered and advice that you could give for someone who's interested in trying to grow these collaborations throughout their careers.

Chris Williams
We have lots of collaborations with academia, mainly UCL. Sorry if I keep singing their praises whilst here on the Imperial campus, but we've had a long standing clinical study collaboration with UCL, which has allowed us to do early development, early discovery in the clinic in a way that we couldn't do within the environment of biotech, more high risk clinical research, you know, pushing the boundaries of clinical development and product development.

And the way we set it up is that we've given UCL the freedom to take the directions they wish and allow innovation to happen rather than it being shackled by the constraints of drug development: we have a very linear, structured path that we have to follow to develop a drug which is very different than innovating in clinical development.

Fiona McLaughlin
All my life I've collaborated with academia, so it's really important to have mutual trust because if you don’t it's never going work. I think that's, for me, the biggest learning. You've got to work with people that you see as part of your team. We don't see academics as being over there. We see them as part of the research team of the therapeutics team. Right now, we fund postdocs and a couple of different university labs. So, what the academic always needs is funding. They need some kind of funding. And you very rarely do FTB funding, so you have to fund people for long enough, for a minimum of a year and ideally three years.

So, you have to have that commitment to fund the lab. It's just been said by Chris, you can't then tell them exactly what to do. You have a broad outline of what the objectives are for us, but you have to let the academic have the freedom to get there. What are the other most important things? As you'll hear the

academics publish, that's always a point of contention.

And because they always want 30 days' notice, and we usually get 24 hours' notice. But um, but that's really important. You need to recognise academic needs. What's important is publications and funding.
And for us what we need is decent data to enhance our translational ability to support a drug. So, a lot of the research physicians that we work with, it's ideal that we can actually work on our drug in their lab and get data in addition to the data that we do. We can afford to wait a bit longer for their data.

Oscar Ces
So, from my side, I work with quite a few different companies, in MSRH we have a large number of people who are corporate clients who have open access to the building, they don't have to come in the morning and sign in, they just swipe in, they've got hot desk to mingle with us.

And that kind of flow really requires trust. But that's exactly what's evolved this kind ecosystem.

And this is what we were saying at the beginning of it, there really are different ways of working here in White City.

So unfortunately, we've kind of run out of time. That was our last question.

But I just wanted to say thank you very much for the questions, but above all, I want to say a massive, massive thank you to all our speakers, thank you for your enthusiasm.

Panel 2: AI for good business: using information better and more responsibly

Prof. Aldo Faisal (Professor of AI & Neuroscience, Imperial College London)

Welcome, everyone, to our second panel. As part of this jaw dropping summit today. And let me have the pleasure to introduce my colleague and co-chair, Sophie Yaliraki, professor of theoretical chemistry here in this building, and also the founding director of DigiFab, which looks at the next way and next generation of developing in designing drugs and other biomaterials.

Prof. Sophia Yaliraki (Professor of Theoretical Chemistry, Imperial College London)

And I guess you already had an introduction, Professor Aldo Faisal. His paper was mentioned before. He's a professor of A.I. and Neuroscience in Computing and Bioengineering, and he's one of the UKRI Turing fellows with an interest in many areas, including healthcare.

Aldo Faisal
And we want to talk to you about A.I. for good business. So how does this link into life sciences? Well, first of all, I think there's a life science revolution and there's an AI revolution going on at the same time. In this panel, we want to focus on the impact that A.I. has on life sciences, but also broader implications for society.

And of course, life sciences are tied to, we hear examples about AI for drug discovery, but actually there's a lot more that A.I. can do for the entire pharmaceutical industry, for example. And in fact, Imperial business Partners have just published a report on AI and the pharmaceutical industry where we have uncovered some of the things that many people overlook.

And you can find it, for example, on my LinkedIn feed. And beyond that, of course, there's the NHS, this fantastic organisation, the largest data generation system in the world for healthcare data. And of course,

also with the NHS, we are doing this collaboration very closely here at Imperial, here at White City, for example, that UKRI centre in AI for healthcare, where we've deployed a lot of technology, some of which were mentioned.

So, there are tight links between AI and healthcare. But I think there's more to AI that we should discover and touch upon today. And so, I'm delighted that we have three expert panellists and I'm going to start at the far end with Neil Lawrence, who is the DeepMind professor at the University of Cambridge for the Machine Learners among you. He's the person who brought Gaussian processes to the masses and he's really a thinker in the field.

Sophia Yaliraki
We have Dr. Anjali Mazumder, who is the Theme lead for A.I. and Justice and Human Rights at Alan Turing Institute as a pioneer of what we want to be discussing here today, how we can be responsibly thinking about using new technologies.

Aldo Faisal
And the whole thing cannot work without the side of the world that actually takes products, business and technologies forward. And so we're delighted to have Eleanor McLaurin. She's an expert in tying together A.I. technologies and regulatory affairs together so we can actually deploy these products and, for example, prescribe them in the NHS.

Sophia Yaliraki
We are absolutely honoured and delighted to have each one of you. And I think touching on the different aspects of what we are trying to do here today, which is how innovations in the University can translate in business, but also impact government policy and our everyday life. And I think with that, we want to start with a specific question to start this discussion.

Aldo Faisal
So, we asked you to prepare a two-minute statement that I'm rigorously timing with my fingers and I'm again going to start from the far with Neil.

Neil Lawrence
I think that the really interesting challenge that I'd like to sort of open with is the pervasiveness of AI technologies and the inappropriateness of most of the ways we respond to innovation. It's not the same as graphene or anything else. It's much more like the first days of computer science. And so, what I love is this quote from Robert Solow, from 1986, which is I see computers everywhere apart from in the productivity statistics. So, my modern quote is I see AI everywhere, apart from in the productivity statistics and the reason that happens, I think I can characterise it two ways. There's two ways in which AI can be good for business. And you know, in 1986 I was sitting there programming a BBC B computer. Well, I was actually playing the game of Elite Two all the time because the computer games industry launched, which is to a large extent the reason we could all video conference each other during the pandemic, because the amount of Xbox data moving around the Internet is way larger than the amount of video conferencing data that moves around the Internet.

There's an extraordinary thing that happens. You get green field research, things that people didn't envisage, and then there's a question mark around about all those sorts of things that we traditionally considered productive, like supply chain or manufacturing or the life sciences. And I would call that brownfield innovation and its orders of magnitude harder. So, no one asked for chatGPT, no one asked for foundation models.

We had surveys and questions where we said, what would you like AI to do? And the one thing the public said, this is done with the Royal Society Review. About seven years ago, everyone said we don't want it to be creative. That's the last thing we want it to do. We would like it to help doctors. We would like it to make the society more efficient. We would like it to make society more equal. All of which are extremely hard. And none of these recent breakthroughs will do. It's not that I'm against them. They're exciting. But they are not going to affect many of the problems we face. And I think that **AI is like computers in that way, and we'll only know it's successful when we stop saying AI because we don't say computers all the time nowadays.**

Anjali Mazumder
I'll share a little bit more of my personal journey on this, is that I came from the field of statistics, and I got into it using John Tukey sort of famous thing. If you know, statistics kind of gives you the chance to play in everyone else's backyard. And so, it's given me the opportunity to work across health, education and justice that sort of in its broadest sense.

And through that, I wanted to look at how it could help to build tools that would support from a decision support perspective. That was my initial kind of area of it. And what I also found through each of my experiences was that there was, as technology was developing and you had the opportunity to sort of ingest more and more data and people were getting excited that you could collect, you could use this data.

There's also this question about actually, is all that data really needed? So, yes, there's questions of quality, but also you may not need to. And that really started to start to get into the question, the issues around the human rights and kind of law issues of both bias and privacy, but data minimisation and really how much do we actually need and increasingly into these areas of well, if we are needing to, if we see a real business need or science need to ingest all this data, then how do we do that in a way that is protecting and respecting human rights?

So whether that's privacy or non-discrimination or any of the other kind of fundamental rights that comes through and increasingly that's been for me, that's been around working with societal challenges where the interest is to bring data, often sensitive data that is siloed sitting across sectors, not just organisations within the public sector, but actually across public, private and non-profit sector.

And so, recognising what is the value of data, but also really when it's combined and that potential power but also risk. And so, it's this dual issue around the ramifications of potentially bringing together these datasets combined, balancing that with the power that it potentially has, whether that's around life changing, life saving measures to any other kind of area.

Eleanor McLaurin
I work for an organisation that leverages AI for specific use cases within life sciences. And I guess in answer to the question, is it good for business? I think absolutely. But I think to some of the points made here, not necessarily on its own, I think as an enabler you mentioned, it's really the perfect point and I do think that of course this goes hand in hand with data and the quality of the data, the standardisation of the data as to how effective that AI can be.

We, for example, at my organisation innovated about 20 years ago electronic data capture. So, we were one of the first EDC platforms for those who don’t know what that is, capturing electronic case report forms in an electronic format. And really the goal at that point was to create organised operational efficiency. But what we found is that because that technology was so widely adopted, we have this huge amount of data and I think there were some discussions around responsibility.

We now realise that we have these very powerful insights that we can get that can completely transform the way that clinical trials are run. So, I guess in summary. Yes, it's good for business. It's not necessarily on its own.

Aldo Faisal

Thank you very much. I think the interesting thing about these, what is good for business and our thinking about other things aside that the maximisation of profit doesn't make good business is always highlighted when you see these beautiful business school reports where you see large studies and companies and you find, for example, companies that do a lot in social good or that do a lot for sustainability are also typically companies that perform very well in economically.

And the question is, how is it looking with performing in the AI domain? And there is a **beautiful study by the London Stock Exchange Group where they asked CEOs at the London Stock Exchange where they're seeing themselves in AI, and 90% answered that they're leaders. And then they asked the same companies, Head of Data Science or Head of AI, and 15% thought they were leaders in the field. So, I think there's a disconnect sometimes between actual capability and desired management capabilities.**

So, taking from there, we were thinking of popping the chatGPT question because I think it's in many people's minds, chatGPT being a chatbot that can generate fairly elaborate answers. You can pass many exam questions these days with a chatbot answer at least 2 to 2 to 1 level.

And how is this revolution that some people now think only started about a week ago when chatGPT was released? How is this now going to impact how we do business, how we do research? And maybe we start with Eleanor on this.

Eleanor McLaurin

Good question. I think it's an incredibly useful and exciting tool. I think there are obviously concerns around how that then gets used, and that's really a sort of human intervention question. I think certainly from a technology perspective, it presents a lot of positive possibilities. But who's going to, regulate that and show that those responses are not introducing bias or issues that some you would get with human responses potentially as well.

I don't think there's a positive development in general. I think the question is how do we then regulate that and how do we use this and where is the line drawn? Yes, maybe kids shouldn't be running their entire exams through it. It's not necessarily going to lead to an enlightened population.

But, in terms of the technology itself, I think it's very cool.

Sophia Yaliraki

I think there's already been interventions. Many schools have already said they will not serve the essays at home. The kids will have to write essays in school. And also, there's already people saying there is bias and political bias already in there.

Anjali Mazumder

I guess certainly, we are seeing it already in the educational sector that it has become a challenge to sort of see how you could better potentially actually support what you can do with it. But also, to again hold students and others accountable to what they're producing and to support that.

But I think there's that liability. I think there's a broader kind of risk and opportunity there in terms of a fundamental rights perspective, there is the opportunity to actually enjoy scientific progress and to have

authorship on all of those accounts. Those are actual rights that we do have. So now those things are shifting both with chatGPT and sort of broader other foundation models that are being developed.

I think the considerations that need to be thought of, especially if they start to get implemented in business and you're building it off business practices, that's where we haven't quite got into our understanding. And that's where I think sometimes, we get into conversations about the law hasn't caught up or even ethics hasn't caught up, and some of it is just actually it's siloed.

There's been technical technological advances, but also the interpretation of the law and how we best then protect workers, protect organisations and make the best use of technology and hold respective organisations and actors to account.

Neil Lawrence

It's so nice to be with Eleanor and Anjali to hear different perspectives because I think the more you sort of try and learn about these things, the more you realise you don't know things and actually other people know things. Not sure whether chat GPT knows these things. One of my favourite things is working with people and I like it because I like their stories and the things they do and the things they're fascinated about.

And I guess chatGPT gives the sense you're working with the person when you're clearly not. You're working with an interpolation between what people have thought, and I'm very curious at which point it becomes like the fascination we all had when we first got Alexa, the assistant or Siri. Then that quickly turned into frustration, a pretty irritating thing, but at least I don't have to switch on the radio now. I can just tell Alexa to play it. I suspect something similar will happen with this technology. And I think when you look at what's going to happen, it's very interesting and I think the best you can do is try and look at historical precedents.

My favourite historical precedent comes from the story of someone I'm trying to work with at the moment who's a sort of serologist working on cuneiform. It's so interesting hearing what happened in 3000 B.C. when first of all, people could do what exactly? What I'm doing now, writing notes. And you didn't have to remember stories. You didn't have to remember the epic of Gilgamesh. Have someone specialised to tell it. You could actually write it down on clay tablets. What a revolution that would have been. It must have blown people's minds when they saw it.

In fact, in every other society where writing is introduced, it starts as religious, whereas in that society it started as an accounting technology that became poetry. Every other society, it becomes religion right from the beginning because it's so mind blowing. The scribes dominated the societies because the scribes had control over writing. Writing in many cases stayed very complex. It stayed complex like hieroglyphs and controlled by the people who wanted to control the population. And we were somehow lucky because it came to us, to the Phoenicians who were traders, and they got a simplified version. Our scripts were very simple right from the start in Europe. And there's an argument that's kind of what's happening with chatGPT. We've seen this process that took a thousand years, this would be ancient history. By the time they're writing this, it's 2000 years when the Sumerians created this stuff. I think that there's really rich lessons there, in terms of it starts as an accounting tool that then becomes a tool for poets. And what's happened in a very compressed period of time is potentially what chatGPT is now a tool for poets.

It's going to be enormously disruptive. And the other precedent I'd like to put in there is the printing press, because what did the printing press do? Well, it led to almost 500 years of unbroken war in Europe as people learn new stuff. And I think these technologies are enormously disruptive.

Anything that is dealing with communication and facilitating communication will do things that are very difficult to predict, and they'll be both positive and negative. And we need to have good conversations involving a broad range of people to try and work out what do we do about it.

Aldo Faisal
Great. Well, I think let's stay on the tricky bits. And by the way, some of these questions may or may not have been generated by ChatGPT. But let's look back at business. And patents are essential for business, especially in life sciences and biotech. And now the challenges patents require some form of inventive step that sort of some stroke of genius that it's not just, you know, an expert applying their standard knowledge to combine things.
But of course, these experts can use better technologies and if AI systems can help you search molecular spaces to find drug combinations automatically any student can start developing and discovering drugs if you have proposals being combined from different fields by chatGPT. And you may have few new technologies that any engineer can create suddenly. So, do you think we're at risk of losing the definition of the patent because we lose inventive steps?

Aldo Faisal
We start with Eleanor.

Eleanor McLaurin
It's a great question. Firstly, whether yours or chatGPT, I think I have to think about that. I think about the business that I'm in and really our goal is to get treatments to patients that are sick and to get them there as quickly as possible. Anything that helps to speed that up and lower risk is a positive thing. I guess in terms of the question of patents, I don't know that it necessarily minimises the risk of patents. There's a philosophical question to ask. Well, if you can pay for technologies and therefore, find these scientific discoveries, then are we creating some kind of bias there, that then becomes whoever can afford that technology? I think there's a question mark over that.

But from my perspective in terms of what I do, I think anything that helps us get to those decisions quicker and is more sustainable and helps those patients quicker is a positive thing.

Anjali Mazumder
I guess a couple of things to potentially consider is that there is a risk with any of these models that are being developed, including chatGPT that they're automating something. They're taking away potentially the opportunity of creativity. But you can argue that it's automating certain things that could be helpful that are potentially easier done.

But I think there is the autonomy and the creativeness that is potentially being missed, even if there is the opportunity that you could still add to chatGPT or any other kind of A.I. model or foundation model and do something more creative with it.

I think there's the part where fundamentally in terms of how the law interprets that, there's specific issues around it. And that's going to be an interpretation issue in the courts, which we haven't quite hit at this point, which will be interesting. It's been raised about training models and who owns that and how the law responds to that. So, things that are getting used and re-used, we still haven't really seen how the courts are going to really handle that.

Eleanor McLaurin
This is still creativity. Even if you're speeding up a process, there's still creativity in how you train those algorithms, how you understand it and how to then further develop those molecules.

The point that I made earlier was, are we creating bias because someone can afford the software? Well, are we creating bias because someone can afford a better education? Or more access to knowledge somehow? I think it's how it gets applied.

I think it will change the way that people look at how certain processes are done and that make space for additional creativity.

Neil Lawrence
Well, I think the example I wanted to bring up was what happened in databases. You get the situation where companies own data and that's kind of an odd situation. And I'm not an expert. I've tried to understand what's going on here because you can't actually copyright facts.
Data, I think by law, is broadly considered facts. I think what happened in the 1990s, certainly in the UK and the US, I'm not sure if this is true in Europe when it came to people wanting an ecosystem of databases, financial incentive to create databases because curation of data is quite a lot of work. This is still a problem we haven't resolved today. To me this is a massive problem.

I think for copyright you have to have some creative stuff. What does that mean? Well, they decided that creation of a database schema was a creative step. A database is creating a schema, it is a really boring thing, where you're describing what each column contains. You have to tell the computer this contains numbers which have floating points. This other column contains a small text field. This column contains a password. It's highly tedious. We have this world of computers and they kind of make the world less tedious for us. But the truth is, because we're the flexible ones, it makes our world more tedious because we have to spend all our time converting things into language the computer can understand. So, it's that type of tedium doing this. They decided that was a creative step and they decided it not because someone said, oh, it's the same as creating music or painting. They said, Oh, well, because if we don't incentivise the creation of databases in some way, people won't be able to charge for it. This is a historical decision from the 1990, as best as I can understand, I wasn't involved in the debate and now we're faced with the same type of decisions. I think it really emerges from these sorts of existing technologies, these existing regulatory mechanisms.

I think that the reason patents came out is because people didn't want people to keep things secret. Because having a secret way of doing, producing things, that was felt to be bad for society.

So, patents allow you to tell everyone what you're doing and have a period of time when you have a monopoly on it, which is a really interesting idea. I'm not sure that's how any of these things are being wielded today. But what I like about all these technologies is they cause you to ask the question, what is the fundamental purpose of intellectual property?

What do we consider creativity? What do we consider it 50 years ago? What do we consider it today? I think the difficulty is you now have to patch the regulation. We have a regulation like, MS-DOS with Windows 3.1 on top of it, and then Windows 95 that is building on an underlying structure.

You're not allowed to for very good reasons, throw that all away and say, well, let's start again with current Windows XP. You can't do that because everything has to be backward compatible. It's true for so many of the levers that we would like to use in this space that we wouldn't have built it this way if we'd known what was going to happen. But by the same token, that's where we are so I think it's really difficult and I really actually delight in the way it asks these fundamental questions about what we think creativity is, which Eleanor was already sort of just exploring.

Sophia Yaliraki
Each one of you all brought these issues we've all been grappling with. We do need to create databases for the problems we are working on. And we do need to give credit to each of the people who are working on it. I think fundamentally, we all want to keep humanity what makes us human, which is the process of how we experience creativity ourselves and not outsource that to a machine.

So, I guess with the way things are moving so quickly, do you think that we have left the law, the way companies respond to what we should be doing behind, and should we be perhaps thinking about how to bring all of this together in some way?

Eleanor McLaurin

I think where we question creativity, I mean, for a software developer or a database producer, creating that content in a particular way is arguably no different to creating a poem, right? It's the way the world has moved and it's something that needs to be done. And when you think about how A.I. works, you're training it like a human, like a child.

And the way that you do that is really important. The way that you create those algorithms is going to be based on people's opinions and levels of ability. And that can be arguably a creative process.

Neil Lawrence

I just thought I'll bring it together. It's all very well blathering on about cuneiform printing presses and copyright, but what do we actually do? And that's what policymakers have to decide. And I think when you look at the landscape, it's quite important, difficult questions around how do we get leverage and understanding on this rapidly and convene the type of conversations we need to have.

That isn't the form of pub conversations that come out with us, which many academic conversations are actually, I mean almost all academic conversations, are like pub conversations. We don't actually do anything afterwards. How do we actually convert that interest to the developed? Well, that's the beauty of being an academic. These things have consequences and it's clear that we don't really have the pathway from understanding the capability. It's really odd because everyone's going, Oh, big tech's doing this. No, all of this comes out of academia. Let's be very clear. All of this comes from academia. It does not come from Google. They've got the money and all that sort of stuff.

But all these advances are coming from an academic community that thought interesting things that everyone that they were told was useless for a number of years. Now the people who are then capitalising on that, a company with large amounts of money. The interesting question is how do we get the leverage back? So, we're getting the academics back involved in that conversation.

Sophia Yaliraki

We talked a lot about talent. And actually, as an alumnus and a person from Kendall Square, I can tell you what made it Kendall Square was the talent. And what we want to create here is talent. But talent is fostered by universities, and it's running away from us.

Neil Lawrence

Well, I think one of the first things we need to stop doing is bickering between ourselves as universities about who should get what money and try and work together better to come out with a coherent plan, particularly in this country, because we're being told we have to become a science superpower. And yet the bit that no one ever says is, you have to do it on a budget.

You look at the other science superpowers and they're all getting 100 million for everything. If you look at this country and you look at our capabilities and you look at things like the NHS, that Aldo mentioned, and you look at the fact that we're geographically quite well connected, and we have a diversity of people.

We have a diversity of universities in different locations that a geographically interconnected culture changes very quickly as you move across the UK. That's a tremendously powerful thing and if we can do something about that to work together and bring all the regions involved and have a proper national conversation, not restricted to Imperial UCL Cambridge and Oxford, then I think we can really do exciting things.

But the first thing we have to deal with is academics. The next thing we have to do is work out how do we have a conversation around actually getting access to these technologies? Because although they started in academia, to build them now costs an enormous amount of money. And I think one problem there is you can say, well, do we build one nationally or whatever else? But it's such a rapidly fluctuating situation so we

don't, open AI have released this. Who's going to release what, will someone open source one of these soon?

We do have to bring people to have a conversation, so we are ready for what to do next.

Sophia Yaliraki
We ran out of time, and we have raised more questions than answers. But I think this is because this was an incredibly successful panel and I really, on behalf of both of us, thank you enormously for your time and effort. And for all of you for your questions. And thank you very much.

Panel 3: How do we fund the life sciences? Reflections from investors in the ecosystem

Tina Tan, Editor of Executive Editor at FirstWord HealthTech

Hello, everybody. We're starting our next panel now. I'm Tina Tan. I'm the moderator of the last. But I like to think the best panel session for today. We're going to be discussing investments. And I'm joined by a panel of very esteemed investors here, different types of investors.

So, before I let them introduce themselves and briefly describe this of funds they are looking after and the type of investments that they make, we just want it to have a feel of who's in the audience today. So, whoever is of there any sort of like Start-Ups who have had fund raising experience, put up your hand.

Oh, in the minority or researchers who think they're working on something that could be like the next big thing is going to make loads of money.

Yeah, that's great. So, I guess we're all here because you want to know how to get that all important, critical funding in order to move that innovation that you're working on through from lab to boardroom and through to market. So, we have a, like I say, a very esteemed panel of investors here, and we have a strategic investor LP Funnel Funds, more traditional sell like VCs, and then Syncona, which I'd say is an investment company, but they sort of like nurture and Start-Up companies of their own.
So maybe they start off with Avi. Want to talk a little bit of what about what you do and how you invest?

Dr. Avi Spier, Novartis (Executive Director, Search & Evaluation, NIBR BD&L, Novartis)

I'm Avi Spier and I work at Novartis in the Business Development Licensing Team. I head up UK section evaluation for Novartis, and it's a real pleasure to be here, and I'm absolutely thrilled to see this amazing audience and participation in this event and also the growth of this innovation district, this bio hub in this area.

It's something most of you probably know. Novartis decided to come here with its investment, with boots on the ground into this area, seeing how Imperial had set up its sort of research hub and bio hub was emerging. We decided we would like to be a part of that and to be really involved in the growth.

We have a significant number of staff members here and I come fairly frequently to help spur collaborations between local scientists, innovators, entrepreneurs, companies with, Novartis, and that can take the form of just advice, a cup of coffee chat, a collaboration, an evaluation, a funding collaboration research collaboration, a research license deal and acquisition of a company.

So, or an investment in terms of just equity investment. So, we can do all of those types of activities. And we're of course interested in most areas across the therapeutic spectrum and most modalities as well that can help me touch on that patient need.

Tina Tan
Thanks, Avi. Russ.

Russ Cummings (Chairman, British Patient Capital)

Hi, I'm Russ Cummings. A long time ago, I was a student, so it's nice to be back for ten years. I ran Imperial Innovations, which became Touchstone Innovations, which was the venture capital arm of the technology transfer activity here at Imperial. But I think I'm here with my current badge as chairman of British Patient Capital. British Patient Capital is a government funded programme to support the UK venture capital industry and we have now around £3 billion of capital committed to the sector, mainly a fund of fund activity and sorry from slipping into jargon.

But what that means is we invest in venture capital funds and it's those venture capital funds that then invest in individual companies. So, I have a slightly different perspective of some of the other investors here, but I haven't lost my touch because I used to be a VC myself and look forward to contributing to the discussion.

Leigh Brody, PhD (Investment Manager, Albion VC)

All right. Thanks, Leigh Brody. Happy to be here. So, like Russ, I have a bit of a connection with Imperial College. I did my PhD here. I went on to start a company based on my research. So spent time in academia and spun a company out from that and spent a number of years in different levels of operations and companies.

And I went on to do what I'm doing now at a VC fund. I work at Albion Capital within the UCL Technology Fund. We're a fund that is dedicated to investing in technology coming out of UCL specifically. I spend a lot of my time talking like you in the audience, looking at what you're researching. See if this is a make sense for a VC investment and we invest in different stages and companies out of UCL.

Dr. John Lee Allen (Managing Partner, RYSE Asset Management)
Good afternoon. I'm John, managing partner at RYSE Asset Management. I was a medical doctor at Imperial, so it's great to be back here and to see it growing and rise. We got into the health tech space as investor partner to Digital Health London, so we started to focus more and more early-stage innovation, particularly care delivery, obviously kind of interfacing with the life sciences as well.

We're kind of really focussed on technology companies which are getting a little into jargon perhaps, but less on the technology risk in terms of will it work much higher on the market risk. Who's going to buy this? And so, we started working in South London to really think about how do we validate these propositions actually work in the real world.

And we sort of extended that sort of validation and clinical trials into a sort of distribution. We took a thematic approach with Novartis and Medtronic and Chelsea Westminster Hospital looking at cardiovascular care. So how can we move the needle? Where's the first million in revenue? And it comes from people and the companies that were supporting Martin.

Martin Murphy (CEO and Chair, Syncona Investment Management)

Good afternoon. I'm Martin Murphy. I'm the chair of Syncona. We're a listed healthcare investment company. We have about a one and a half billion pounds of capital we gain for about 12 years. And what we really focus on is working with an academic with an idea. Typically, they've been working in their field for several decades and we create a company around that idea and then look to provide capital and support to

that organisation as it grows.

We've been very active in the cell and gene therapy space and increasingly in the small molecule and biological space, and we've been very active in this, in this a near geography. So, we have a number of companies that live near here, not least Quell Therapeutics, which is about 200 metres. I think it's that way, which is a company operating the T regulatory cell space and making great progress.

Tina Tan
Thanks. Martin. So, before we kick off the conversation, I just wanted to say that rather than leaving the Q&A to the end, I like my discussions, my panel sessions to be as interactive possible. So, if you have any questions, do raise your hand in the middle of the conversation of some of the panellists is something quite salient.
And you've a question just raise your hand or bring a mic to you. So, see this as a great opportunity to ask these investors, you know, any questions, fundraising or about using them as a sounding board, because it's often one of the biggest challenges is actually getting in front of a VC. Now you have like five investors in front of you, so don't waste this opportunity.

Think don't think of this as like a scary dragon's den, but like a very friendly dragon. You're not asking for money, but you're just asking for advice. So yeah, there you go. So maybe let's kick off by setting the scene a little bit for those who may not have been following the so investing activities of all levels in the last couple of years, I think my panellists would agree that last year marked a big downturn following quite a big boom in 2020 and 2021 in Life Sciences Investments.

I think I have a couple of figures here In the UK alone, the total investment in 2020 was like £2.8 billion in 2021 that doubled. But my publication we track venture capital rounds, and it was about we, we track venture capital around globally. And I'd say the levels that we saw in 2022 was pretty much half what we saw in 2021.

So, I don't want to start off on like on about that, but I mean, we have to recognise that there was that downturn. Did that change your investment thesis or your activity levels at all? Maybe almost all. But like the more traditional VCs knee.

Leigh Brody
Yeah. Thanks. Yeah. I mean I agree. I don't think anyone in the room can disagree that that macroeconomic climate has changed the way things have gone generally across the board for everyone particular anyone who's reliant on those markets to make financial decisions. You know, in our case, because we invest so early, we're a little insulated from our own impact directly.

But thinking about how we make investments, you know, we look at something and assess and say, okay, what is the exit strategy for this idea, this drug that we want to develop? Is this a spin out company or is this something that maybe you can license it out to a company? And what does the market say? Is this a good idea?

You know, is this company going to struggle raising money if we do spend a year spinning it out? And how can we track exactly that progress? You know we have two companies that we are spinning out now. And, you know, we're worried about, you know, an early series, a raise and what that looks like and what the runway will be for these companies.

So, it kind of impacts our decision and how much money we should be investing versus holding on to for to provide that runway. And, of course, you know, we're a fund. We need to go raise money at some point, too.

So, you know, also thinking about it from limiting cash from our perspective internally and saying, okay, we need to go raise money.

So, is the market going be tolerant of that and how long should be last and how should we manage our own activities as well?

Russ Cummings
Yeah, so I guess we have a different role. So British Patient Capital is funded by the UK government and so our job is to strengthen the UK venture capital industry. And so, if anything, we are trying to be countercyclical because we know that the venture capital industry goes through cycles and it goes through peaks and it goes through troughs and our job is to try and keep capital flowing to companies during the troughs.

Now of course that's great in theory, but in practice it's harder, as we've just heard, for the venture capital funds to raise new funds if there aren't other investors, other limited partners committing capital at the same time. And so as much as we want to keep a steady supply of capital to the sector, we can't do it singlehandedly.

And human behaviour is such that in these funds they will try and keep their powder dry reserve capital for their own portfolios and be a little more risk averse of the new companies. At this point, the cycle. So, I think we have a responsibility to try and keep the capital flowing. I'm trying to keep some consistency in the market.

Tina Tan
How it is looking for UK life sciences companies in 2023.

Russ Cummings
Well, you know the venture funds themselves still sitting on reasonable amounts of capital, so capital is available. The one thing that we are acutely aware of is that the UK is more reliant on overseas investors than say the US market is. So, in the US something like 90% of capital to funds is supplied domestically, whereas in the UK it's less than 50%, so about 46%.

And our fear is that downturns overseas investors will retrench as well. And so that has a double whammy of supply of capital to the UK. So again, I don't want to be doom and gloom, but you know, realistically these are tougher times for companies to raise capital than it was 12 months ago. But these things going cycles and so the good times will come back and.

Tina Tan
We'll come back to that, and we'll discuss about things like, you know, how even though these are challenging times, what it is that investors are still looking for because obviously you have a good investment proposition, you'll always be able to get that capital done. I know you invest, you focus on digital health, which is a really, really hot area in terms of investment.

My publication covers digital health and we've seen how, you know, the big boom was actually helped by all that money going into any company that has the word in their presentation in the slide deck. Right. So, did you feel that downturn as much last year as, say, other segments within Life Sciences?

John Lee Allen
Yes, I think that's interesting. If I had to summarise, we've kind of moved from this investing in high growth kind of deferred revenue type world. However, there was a lot of excitement, as you say, in 2021 because,

you know, there was a lot of kind of health tech companies got involved in the kind of response to COVID, so-called kind of COVID revenues.

A lot of investors looking at companies say, okay, these revenues are actually quite attractive. It's quite interesting growth here. And yet for us, the companies that we are supporting, they had a role in in supporting COVID, but they weren't reliant on corporate revenues. So as a response to COVID to die down, they weren't as effective as perhaps they could have been if the entire company proposition was centred around covid.

COVID was an interesting thing for the sector because it brought revenues in for a lot more investors and that was sort of more traditional tech type. And I think really going ahead, it really sort of illustrates that it's quite important to think about where future revenues are going to come from in the case of Healthtech companies.

Yeah, that's why we work a lot with corporates because it's kind of saying, okay, what does what does existing products look like and how the digital and health tech products augment that? Because yes, there might be sort of tightening of R&D budgets, but there is still the necessity to innovate and to look first on a digital strategy, so to speak, for existing products that are out there in the market.
So that's been that's been our approach and sort of how we think about partnerships.

Tina Tan
And Avi as a strategic investor. Did you have a focus change in the last year or so or adapted to what the market demands have been?

Avi Spier
I think from our perspective what was going on in the VC world and in valuations with biotech companies, it's a little bit like the tide, you know, once if the tides are or the boats are up and if you want to buy one of those boats, you've got to pay more for it. Basically, from our perspective of the tides down, you know, it's a bit more value for us.

But in terms of our need to, you know, access and license innovation from the biotech community that is sort of always there. And when we see data come off clinical trials or, you know, preclinical experiments that to us is the most meaningful thing. And if it's at the high tide, we still have to buy that because if we don't in our competitor will potentially when we decide to acquire technology to bring in-house, it's because we feel this is the right time to do that, where we can have the most impact on moving it forward through clinical trial and take it to develop and to society.

So irrespective what the venture capital community and valuations are doing and our business kind of stays fairly solid, we just might have to pay more or pay less. So the other thing is that we notice is that when it's the stock market, that really drives a lot of challenges for us to access innovation, because at the time when jury sort of COVID period, I guess 2021, 22, when the stock market was very bullish and companies could just go really easily, it seemed a common refrain to us when we come in and try and do a deal with the company as well.

You know, we could do a deal with you, Novartis or whoever, but we could also just go public. So, you know, that's a viable option to them and could be economically attractive as well. So, if we had an extra sort of competition to acquire that innovation so that that was something that really impacted how we did business.

Tina Tan
Okay. And just to again, in the scene setting, sort of like tough question around the UK specifically, Martin,

because I know you leverage what's included as leverage the research base just in the UK, but across Europe as well, you have quite a Europe wide sort of perspective on the type of innovation that that there are available. How do you think the UK compares to other European countries and what is it that makes it so more attractive or not to investors to invest in a UK start up?

Martin Murphy
Well, there's lots of technology in Europe and historically Europe has not built the number of large companies that they should have done. If you normalise for the size and quality of that research base. And that's why is that is quite a complex question. It's not to do with the quality of the basic research. Actually, I think that's pretty clear.

There are some quite deep cultural factors that definitely some capital factors, there's some historical precedent factors and there's clearly some management pull factors. I'm sure this group could figure out other things as well. And different companies have different combinations of that. And what you in the UK is that you've got a truly world class centre for basic innovation in the life sciences.

You know, in the world today there are three great clusters of globally competitive life science innovation. One is the UK, one is Boston, one is San Francisco. Of course, there's islands of excellence outside that, but they are the clusters. And if you're in the investment business, you know you're in the harvesting business, what you want to go is you want to harvest in the field.

So, I've got the richest crops. So the UK is a great place for that with respect to these questions around sort of the cycle and where we are, I'd encourage everyone you just got to play the long game really because you know, if you want to do something important with an innovation that comes off the bench, if you're going to be honest with yourself, it's going to take you 10 to 15 years.
It's what it's going to take you. You might get lucky, but it is going to take you 10 to 15 years. If you start at the beginning. And what you know, before you start is that you will be in a cycle. I mean, I've been investing for, I think, almost 25 years. This is my third cycle now right.

And so, you know, you're in a cycle and when you're in the bottom of the cycle, it always feels like it's never going to end. And actually, it's never as bad as you think it is. Actually. The corollary, which you should also remember, is when you're at the top of the cycle and it feels gangbusters, it actually isn't as good as you think it is.

And I think that's the message really, which is focus on businesses that you think are really doing something important. And then the lesson of history teaches you businesses that don't deserve capital don't get capital. They get cleaned out in the cycle. And that's right. They should get cleaned out and they make a lot of noise. Actually, a disproportionate amount of noise.

But they shouldn't be that. What you do find is businesses that are doing something important will find capital. The investors who invested along the way not get the returns they liked because the price at which that capital was available may not be as good as it would be in the good times. But good businesses raise capital. And that's the message for the UK.

Really. We've got an exceptional starting substrate here. We've never had a better precedent for building these businesses there. Actually, by the long historical averages of more capital that has been in the UK historically, still not enough, but actually great businesses can still be built. And if you and – Russ - I remember three days up last night it was sometimes the very best vintages were in those investments that were made in the tough years.

And so right now, tell you what, think we're trying to get money out the door because we think this is a great

time to invest.

Tina Tan
Is it? I mean, it's interesting you say those are doing something important. Well, will pull through. But often having I mean, having covered this beat for quite a long time now, I have to say sometimes, you know, my heart breaks if one of my pet companies just fall by the wayside simply because they can't get enough money.

And it's not because the innovation or the product that they're doing isn't good enough or there isn't a market demand for it. They just simply can't. There's just so much competition. They can't find the technology, the investment to see that technology through. There's this sameness of what they talk about the valley of death. And you know, you managed to get it through to proof of concept.

You say 10 to 15 years is a very long time true. But there is that that importance of valley of death that they need to bridge. Let's talk a bit about like the nitty gritty some practical tips. How do companies bridge that valley of death?

How do they get past that, that point where they can take the, I don't know, format? It could be like phase two. Is that what it is? I mean devices I'm a more medical device girl. So, and it would be like around that like a phase two phase three clinical trials of it time where they need to get the pivotal trial data good And then after that they manage that they get the regulatory approval and then it's a market.

So how is that that valley of death? How did they. I don't know who wants to take then maybe this will want since you ended that comment you can look?

Martin Murphy
I think so. I sort of disagree that honestly a great business as well led. I've never seen one of those businesses not raise.

Tina Tan
Money but see, how do you define the greatness?

Martin Murphy
Of course. Then the question is, which is your question? And those are businesses that have defined the product proposition, have a sensible plan. They can get that, and a management team is credible to execute. There's a super simple thing to say that hard to deliver, but you deliver those things.
Those businesses, in my experience, raise capital. What changes in the cycle is the price and the quantum of capital.

They can raise, but they find a way through. And so, the answer the answer is you can't be developing a business today that's a high science business. Build it and they will come, and we'll figure out what to do with it. Those days are gone. You've got to have a really crisp enunciation of the technology you have what it going to do and why is it going to create value for in life science speak a patient, a physician and a payer.

You've got to figure that out. And got to figure out what's the plan? Can I credibly take it and incredibly raise capital of a scale that's normal for the industry. And if you if you figure that out and

you populate that with people of the right quality capital is available. So, to me it's the margin for lack clarity on the product proposition is done. You've got to be super clear now.

Tina Tan
Okay. We have a question in the audience that the mic is just coming out to.

Q&A
Audience member
For the researchers who would like who wish to start by establishing an industrial academic partnership for example the development of a drug on the basis of the bench work very robust results. What would be, in your experience, the funding source sources that would be available for researchers in the UK general and at Imperial in particular?

Avi Spier
If I understand the question, you're an academic, you have research going on in the lab, for instance. Not, but in general. And, and you want to engage with the pharma company to see if they, the pharma company, can take the project on and develop it further or collaborate to, to see where it can go. And I mean there in general, they say the pharma company, or the biotech was interested would cover the research costs for the study if other if those funds weren't available from say another source. Sometimes it's the research is a bit too sort of early or there's some you know it's not clear that the pharma should really invest at that time. There are too many other things to do, in which case sometimes the academic might want to seek some sort of other funding to basically prove the point. And then engaging with the pharma company can be a valuable thing to do, because then the pharma company can say, well, if you can show this, then we'd be really interested because sort of on that target, on that mechanism, this is where it falls down a lot.

In pharma, nobody's solved. So, if you can solve it and you've got the wherewithal to do that and the team and the technology and etc., that could be really interesting. But if the pharma doesn't invest, it sometimes does. Then there are funds with the universities I think that you can seek from the tech transfer office that our proof of concept funds I know Imperial has and most other universities do so, and there are probably sort of industry type grants when, when essentially when there's some guidance that the project is of interest and that if you get this certain data, it could be a no go. And that's pretty relatively easy, I think, to get the funds secured that help. Thank you.

Audience member
Comparing the UK with the USA, how can we get the UK government to fund research here in the UK like they do in the US with organisations such as the NIH and so forth?

Russ Cummings
I'll try and take, but I can speak on behalf of the government. Clearly what we do here is some encouraging noises about the recognition about the UK as a science superpower and their support for innovation as a fuel of growth for the UK economy. So, I think they're, they're making the right noises and I have to say their support for British patient capital I think has been very encouraging and has gone under the radar.

So, the UK Government so far committed over 3 billion to British patient capital, two and a half billion for its core fund of fund programme. A further 200 million for a life science investment programme and then 375 million for a direct investment fund called Fund Breakthrough. So, the combination of those instruments gives us quite a lot of firepower to support the venture capital industry and to start making some direct investments into later stage companies.

And so, what we are trying to do is respond to some of the call the British Patient Capital Review,

which was about trying to grow UK companies longer and, more ambitiously, so that they didn't have to go to overseas US capital markets to raise capital and therefore change the field of influence. So, we've made a start. Our job is not done yet.

And I think as we talked earlier, we to support the industry through a number of cycles to the point at which it becomes self-sustaining in the same way that the US market has done. But as I was also saying earlier, whilst we've made a great start and actually the number, the amount of venture capital invested in the UK grew significantly in 2020 and 2021, so too did it grow in the US.

And so actually we haven't narrowed the gap. The gap has continued to grow with US activity. And I'll throw one statistic here, which is that by round five or six, when companies are raising later stage rounds and I know this pressure is maybe a problem down the track for a number of you but just by way of illustration, US companies are raising three times the amount of capital than UK companies are. So that tells you that there's still a lack of capital to grow those UK companies. And as Martin said earlier, what we want to do is correct this anomaly that the UK in Europe isn't creating mature, established independent companies and we want to create more of those in the UK.

Audience member
So, you've been making these noises for I don't know how long, how many years are they having the effects you want?

Russ Cummings
So British Patient Capital has only been running for five years. We're a relatively young organisation in the scale of things and I think we've a significant impact and I think the addition of our direct investment capability is also helping to take those individual companies that have been nurtured through the venture capital funds and then effectively doubling up on those and we're making it faster for them to close funding rounds and allowing them to close larger funding rounds than they would do otherwise.

I think by continuing to do this, clearly one of the things we want to demonstrate are the returns available to investors in, this sector, because the more successful we are, the more that will encourage others to invest. Our cumulative returns to date are over 30%. We're creating a compound return of over 30% on the investments that we're making, which is great for everyone here as taxpayers because it's taxpayers' money.

So, it's a great way for the government to support the industry and make a return at the same time. But if we can do and other people start drawing attention to what we're doing, then perhaps we start winning more hearts and minds to encourage our pension funds to invest in the sector as well. You'll hear there's a lot of thought going on in government as to how we can persuade direct contribution pension to allocate more capital to illiquid investment assets such as venture capital.

So that's what we're doing, and we hope that that will continue to create this snowball which will grow.

John Lee Allen
Just for the room. She said the NIH in the States and the NIH is a funder of academic research from government, and England does have that in in significant amounts as well through the research councils. So, we do have the equivalent, of course, NIH makes a lot of more is bigger because the American economy is bigger.

Ratio wise they have more funds to give out. The UK does have I don't know if it's the same ratio of sort of sort of tax base to as NIH has maybe a smidge less and could be yanked off a bit. But yeah, we do we do have that just so that that that that that's not hanging out there in the room.

Yes. Just to continue this sort of source of capital, we have a great question over there. I think NIH is around 30 billion a year. So, it's kind of a government source of funding. And then you've got private philanthropic. The largest in the UK is probably the Wellcome Trust. It's about a billion a year for health. You've got kind of unlikely government sources, the Department of Defence, you know, kind of unlikely, you know, about a billion in health funding.

To kind of bring some optimism and perhaps talk about family offices that we haven't talked about so much with the private philanthropic, you know, within the UK market, that's a very, very large family office community, have kind of strategic. So perhaps if you're developing something in the cancer therapeutic space, strategic interest, you know, Parkinson's, for example.

There are these sorts of specific areas of interest which would be of interest to kind of family offices. I just wanted to bring in another source as well as government and philanthropic.

Audience member
Have, we are in a challenging time and companies are making losses. If someone wants to apply for funding and I mean Life Sciences company wants to apply for funding, is it a good time to start now? Wait for decision to end, which we don't know when it's going to end and how badly it's going to affect the economy, the global economy. So, is it a good time to apply for funding from the venture to the venture capital?

And second question, which is related, or because I hear a lot these days that, oh, life sciences companies are recession proof, how do you guys think that that is true, that life sentence, life sciences companies are recession proof or it's just that people are saying it because of COVID. You know, a lot of pharma company went into profit later on.

Tina Tan
I guess it depends how much you want to raise right? I don't know who wants to take me.

Leigh Brody
Yeah, I mean, I think to anyone here, you know, if you have an idea. Yeah, absolutely. Like do it yesterday. You should absolutely pursue these ideas. You know, to back up Martin's point, like we know the market is cyclical. Everything is cyclical in this case, and it takes a long time to develop a good idea to any place that is even thinking about commercial terms.

So, yes, I mean, don't worry about it. Just do it. Talk to V.S., You know, talk to your tech transfer office, talk to your lab and, you know, pursue any of these ideas that you have. So, I would encourage everyone to do that. All right. You know, there's a lot of, you know, look at how the UK ecosystem has developed over the last ten years.

I mean, there's a lot more topics and discussions like we're having today of know fuelling university ideas and spinning those out into company and that unification between academia and industry and how things work together. There's a lot more incubators, there's a lot more PhD students who want to talk about this are starting unions and groups and VCs like us, you know, mining through labs racket in universities to see what's interesting and how we can work together.

Audience member
On your comment around the Valley of Death. So, you suggested it was between phase two and phase three.

If you're an academic, it's way upstream of that, right? Way upstream. It's more like getting to

preclinical stage and you know, areas comments are very appropriate from pharma can be very familiar to me and but you know if you need to actually generate good preclinical data you know typically the translation funds available from an institution are sort of like 50 to 70 K Now if you need to do animal models and get good preclinical data that doesn't touch the sides, grant funding also isn't very friendly to preclinical data because it's no longer discovery science.

So, there is a real valley of death, and a real trap is and there's no that I'm aware good funding model as to how you get over that. You know how, you really test your hypotheses in such a way that you have data that's good enough to take the area or the kind of other VCs that they can go, Yes, this is a viable proposition. We want to take a deep look at this IP.

Avi Spier
I feel what you're saying acutely. I spent many years at Novartis coming up with, dreaming up mechanisms to kind of deal with that, but not with a sort of throwing cash at it. The problem with cash is limited on their side too, but really engaging scientists to scientist and trying to.

We could do that experiment for you potentially, or we could do it with you, um, we don't necessarily have to have a financial transaction to see if there's any there. We could actually have a scientific interaction. And so, I think coming up with novel to address this point that don't exist in or don't exist in any real meaningful way in today's system of doing this need to be sort of generated.

I have my ideas. Couldn't get them to fly at the time. But I think that it has to happen because there's not enough money to fund all the innovation that is out there and need and should be tested. One way we did it with the traditional mechanism is through an accelerator fund and they exist like sort code on Novartis became a limited investor in that and that whilst it can only do say I think 1010 sort of investments have around 250 to 500.

Yeah, it kind of addresses that gap. But inside a company you can't, it's hard to just sort of just get it to get the funding straight to the labs, but um, you know, and again to everyone else's points, things that are obvious that hit the bull's eye in terms of the innovation, in terms of, addressing an unmet medical need, making a breakthrough that is obvious to anyone will get that funding.

But it's the things that need to be proven a bit more.

Russ Cummings
There are some very innovative and specialist investors around who do try and address this because agree, it's a very difficult area. My colleague here has got some innovative models for proof-of-concept funding, bleeding into seed funding, but just one plug. And there's a guy called Tony Hickson, who's in the audience who was instrumental in helping to form a company called Apollo Therapeutics, which also works in this very early discovery phase and has a number of pharmaceutical companies that are invested in that fund.

And they will invest prior to a company being formed, which could go either down the licensing route or into the company formation route. So, organisations do exist, but you're right, you have to look very hard to find them.

Leigh Brody
And I would just add one point because we spend at least at the tech fund, we spend a lot of time thinking about this exact point and especially how even trying to get tax models done, the prices have doubled. It's really a tough time. So, two things. You know, I think the government does a really good job on some funding schemes like DFS.

And I think, you know, if you can kind of leverage some of that, I think there's a lot of new pockets opening up. And the other point is that I think funds, especially VC funds in life science, are looking to go a lot earlier than maybe they didn't go many years ago. So, I think approaching VC is never a bad idea.

And this is something where people who do life science, early stage, constantly paying over these exact things. What are the right experiments that we need to map out with the right amount of capital? To answer the three questions, we need to know if this is a good idea or not. And so, I think approaching VC funds to think about that really early is always a fantastic idea, if not a coffee.
Maybe you have an intro and I spend a lot of my time working with other VC funds who want to syndicate means invest with us alongside. So, if you need 2 million, 3 million to do these small preclinical experiments, then funds do work together quite a lot to put money, money aside for academic labs to really validate the science.

So, I think the ecosystem from that level is getting much more aware where the holes are of government and academic cash, just not being exactly what needs to happen at the right time for this for that particular valley.

Audience member
My name is James Groves and investment manager here at Imperial, and I just wanted to take the conversation to the ecosystem level, really, and thinking about why it's set in Imperial, how do we make sure that we remain leaders when it comes to attracting capital? So, one area is a captive fund. So, Oxford, Cambridge, the development of northern Gritstone, you know, is really catalysing the capital into those ecosystems.

If we think about those small and I'd be interested to know the panel's opinion on whether those funds which have enormous capital behind them and the focussed laser focus on one area, whether they are a great force for good in their ecosystems, for catalysing sort of the start-ups.

Martin Murphy
I think what you want is you just want more smart funds with lots of money and you don't really about the flavour of the captive non captive evergreen term limited. What you care about is quality because what you what you really need are people who know the business of making early stage investments and can manage capital in that structure and do it alongside an innovator who will be an expert at their thing, but won't have the first clue about how to pull this together in a coherent way that's where the sort of creation happens.

So, I wouldn't be hung up on the structure of those funds. I mean, if someone said here, you could, you could get a captive tomorrow of 50 million to get guy Great. And then focus on getting the very, very best people you can to run it. That's what I would say focus on the people independent of structure that we might be.

Audience member
I work in digital policy for the NHS. I think what we're seeing in the NHS is that venture funding doesn't necessarily correlate to kind of clinical efficacy and it's having, although we're seeing, you know, record investment in digital health, the outcomes aren't really being seen yet and the NHS and so I wondered, you know, digital health funding I think is an amazing scheme to me.

This is one for you, John, but what do you think the NHS can do to be a better partner for kind of industry? Both on innovation and on the investment kind of side? We are doing some exciting things into the health policy, but it is enough to kind of support the investments that are making.

John Lee Allen
For the first thing. So, I think that the NHS is already a great partner, you know, particularly when it comes to validation, know there's a lot of appetite for now will this work in the real world. I think you want it when the question is how can it be better? I think it investment is kind of a social industry and.

I think we kind of keep touching on that and we talk about the Valley of Death and, you know, how do we overcome that? And I think there will always be a valley. How do we make the valley tighter? I mean, I think is making a great point where the more investors comfortable with the space, more kind of operational type background, they have that earlier, they'd be willing to go kind of rather than sitting back and waiting for revenues to be great and saying, okay, we'll come in.

Then the more likely to take risks that sort of narrowing the gap in terms of what the NHS can do for that kind of health tech is, you know, providing visibility on your how your commercial relationships work. So yeah, we see companies that enter contracts for, say, a one NHS trust, one GP practice, but then it's still a little unclear as to how that will grow.

I think when you have clarity and ultimately kind of assured, you know, how will revenues go from 100,000 to 1,000,000 to 10 million, you have more of those sort of data points is what really brings, you know, builds trust and brings more investors into space. I'd say that's I mean that's an area we think a lot about, and you know we think that's a very important partner.

But I think the commercially working with the NHS it's it sort of looks like it could be centralised, but it tends to be fragmented in practice. And so, you know, kind of overcoming that, you know, whether it's a regional approach, yeah, initially, you know, the NHS ends have done some work in academic health, science networks have done some work to sort of say, okay, it works and one centre within this region, yeah, we can apply it to the whole region.

Tina Tan
I have a question actually you are a UK innovator. Should you look to the UK first as your first go to market or should you in your plan think about the US? That's what a lot of people say. You know, see the US as your first go to market because it's just so much bigger and that's where the money is.

Martin Murphy
Yes, go to the you got in life sciences, you go to the US first.

Leigh Brody
I mean, all of our companies, that is the road map. That's how we think about.
I mean, you can't avoid the payer aspect of it. And when you're modelling out, is this going to be a good investment or not, that is the market you're basing your mouse on.

John Lee Allen
For health tech, it is I think not as simple as we can't be as confident because, you know, the US healthcare sort of reimbursement is very different from UK based and its sort of constantly evolving. So, for example in the UK you've got about 80% public payer for healthcare services, you know, private service is around 50 and sort of but you're seeing that grow and then you're seeing sort of consumerization out-of-pocket spend.

And so, it really depends on the company you know some companies really apply to us, you know, maybe kind of Swiss market to reimburse other companies. Yeah, there's a very strong health economics case, you know kind of clear cost saving. So that kind of a public payer distribution makes much more sense.

Audience member
I guess my question is to end on a positive note is what are the key technologies or themes as well as sort of clinical indications? That is exciting. You think John mentioned cardiovascular things and kind of name pharmacology, but in terms of future looking for UK life sciences, are there particular ones that excites you for the audience.

Martin Murphy
To be aware of? Look, we're living in the most miraculous time where the ability to understand disease, we can understand a level we've never under been able to understand the historically. You know, genomic sequencing is essentially free. We can characterise at single cell resolution disease and so the ability to understand the fundamentals of disease and we now have such an array of tools that are critically and commercially validated, you know, good old small molecules, God bless them, biologics, antibodies, gene therapies are in a viruses, you know, the list goes on.

So, what you've got is this incredible knowledge. And then when you so data on top of that, you know, we're going to live through the golden years for understanding disease and our ability to treat it. And why can the UK compete here? Well, clearly, we've got basic science here, but this is going to be a data driven phase of the industry.

And we've got these incredible assets like the NHS. If we can get it to work in a way that provides data, if we've got things like Biobank right, we've got genomics in the UK and that is a technology. So, the ability to put those assets together to identify new modalities for treating disease with a range of modalities that frankly are no longer science fiction than our commercially validated technologies, there's just an incredible amount to do.

So, the challenge here is not going to be finding a good idea is going to be tons of good ideas. The challenge is, can you build great businesses that can you get great people to come in working them and can you bring lots of capital? So that's why I'm optimistic we're going to.

John Lee Allen
I mean, we've always sort of saw digital health and health tech sort of in a little bit more in the diagnostics space. So, you know, classically kind of more difficult to commercialise. But I think what we're really excited about is the digital therapeutics. So, kind of digital products that are sort of becoming part of the therapeutics cloud, which I'm kind of surrounded by on this panel.
And I think that's really important because therapeutics, it's much clearer in terms of regulation reimbursement. And so that's what we're finding particularly interesting.

Tina Tan
What about you, Avi, from Novartis? I suppose you have your key focus areas but have any white spaces that you have that still exists for you, that you're looking out for innovation in this space is.

Avi Spier
Novartis is undergoing a sort of a transformation to be a pure play innovative pharmaceutical company. So that in itself leaves a white space outside of Novartis. But I'm echoing Martin's points. I think that we live in this amazing age of information, understanding and technology and our capabilities to modulate biology that we've never had before.

And then there's more fluidity to entrepreneurship than that has ever been. It's more egalitarian. It used to be kind of a club of friends and brothers. Now it's just anyone who has an idea can really go forward with it. And it's based on the quality of the idea. And if you don't have a team that have expertise, it can be filled in around you.

I think so. I think that's going to lead to just, you know, just an absolute plethora of really helpful, innovative and transformational therapies and understanding. And then to me, you know, it leads to big questions that like the big, uh, you know, challenges out there that we're going to be still struggling with like ageing. You know, I think those things would be the, you know, the next frontier once we've sort of dealt with hopefully, you know, sort of therapeutics.

Audience member
Hello thank you very much is just we are talking about life sciences, but also, we are aware that is we have healthcare expert industry experts with us. My question would be now, as we know, we have a serious pain on NHS waiting list. Do you have any priority prioritisation on your investment strategy too, especially specifically on start-ups, which can be a solution provider on this problem?

John Lee Allen
Yeah, I mean, absolutely. I mean the staff that deliver care. This is my background, so, you know, this is very important to us, and you know, the whole thing. Absolutely. On that and the workforce in know declining health care workforce I mean this is a huge challenge. But to try and specifically answer your question, we think that the aspiration over the past several years has been kind of reducing inpatient beds, inpatient beds to remain stable, not reduced.

And that's kind of this aspiration to provide, you know, almost a third of their ward capacity in a virtual sort of at home care. So, we see moving from the centralised hospital base into the community hospital at home, so to speak, and we see a lot of digital products that are facilitating that. So, biosensors in the home, partly why we're excited about digital therapeutics because we think that when you get therapeutics reimbursed and you start to see these companies grow and become larger, those so potential for some single double-digit companies that could really change how care is delivered.
So, we see some of these digital there's an opportunity for really kind of disrupting how. They're kind of the offline health care providers have worked. I mean, some of them will adapt and will become more digital. But we think that space for a digital provider care to.

Martin Murphy
I really like the question because, you know, in the last 40, 50 years inflations ignored now, but it's been on average one 2% health care spend in the last at the same pay has been 5%. So do the math that doesn't just consist of can't persist. And that's because we have a model of the health care service which is about treating people when they get sick.

And we've got very good at keeping people alive because of the triumphs of medicine. And they're getting older as they get older, it's incredibly expensive to look after them in these specialist referral centres. So, what do we need to do? We need to be focussed more on the prevention of disease and I think there are some real technology opportunities there.

Actually, there are some business models to be worked out, but I think one of the big trends is going to be not only focusing as an industry on in-hospital treatment of patients, but it's picking patients up early and how do you prevent them prevent chronic diseases that you could have got to earlier and intervened earlier and prevented them escalating into many, many years of chronic disease?
That's a huge imperative in my view. And there's technology there and this business model has to be figured out. But I think it's a direction of travel that, frankly, we have no choice to go down that road because the system we need, we can't carry on as we've been doing.

Tina Tan
Right. Thanks, Martin. I'm afraid I have to wrap up now. I know there's still lots of questions out there. I'm sorry you couldn't get to it, but I'm sure you can get hold of our panels later on. But before we

leave, I did ask the panellists to like a prepared self. One statement, one piece of advice to impart to the audience.

What is the one piece of advice they would give to companies looking to seek funding at this time?

Martin Murphy
Look, you only live once if you if you have a good idea, give it a go.

John Lee Allen
Your customer and of course it's commercially what are the commercial opportunities but also the customer In terms of investor, what is that stage? What is their focus? Because if you understand that they might not invest, but they will help you find that the person that does.

Leigh Brody
Yeah, my only point is just kind of like, Martin, just go for it. You know, it's okay to make mistakes. You will learn along the way and we're all up here because we've made a lot of mistakes. And that's where you learn. So, like, get your hands dirty, get into the weeds, learn how these systems work, reach out to people, have coffees, VCs are not you know, it is there is no firewall, right?

So, you can absolutely approach anyone and figure out, you know, how can I get the right kind of funding from the right source with the right people for my idea and, you know, keep going.

Russ Cummings
Don't underestimate the importance of people and talent science isn't the be all and end all raise more capital than you need and use that extra capital to go and hire some great people.

Avi Spier
From personal experience, I start the biotech company as a naive postdoc some years ago, and I think that is my abiding memory from that time is, you know, if you believe in something and you want it to happen, do it and be absolutely persistent in making it happen. Don't do it sort of like lightly. Just go for it and don't give up. Make it happen.

Tina Tan
Great. And with that, I'd like to thank panel and thank you very much to the audience as well.