



HealthTec
at **Harwell**

HARWELL HEALTHTEC CLUSTER

Cluster Strategy 2021-2031



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Foreword

Dr Adrian Hill & Dr Barbara Ghinelli

The launch of this refreshed strategy marks an important milestone for the Harwell HealthTec Cluster after five years of strategic and organic growth. Over this period the campus as a whole has seen significant positive change, and this has been particularly true for the HealthTec Cluster, recognising significant investment in new research and manufacturing facilities, tripling its size in terms of member organisations and acting as a key driver and enabler during the COVID-19 crisis; made possible by a combination of factors and the unique ecosystem found at Harwell.

Much of what has happened to date to develop the health and life sciences capabilities at Harwell is attributable to the foresight, vision and determination of a number of key individuals, member organisations and strategic partners. Together they have monitored the needs of industry, identified opportunities for growth matched with the importance of upskilling the workforce in upcoming next generation technologies, and even anticipated the requirement for a national Vaccines Manufacturing and Innovation Centre (VMIC), that helped accelerate the UK's response to the pandemic.

Focused on a set of well-defined fields of research and specialised industry, this evolution of infrastructure and expertise at Harwell has now created strong foundations for a unique community capable of delivering next generation advanced medicines, vaccines, diagnostics and imaging tools. It occurs at a time when these industry sectors are growing exponentially, attracting significant investment and representing a major opportunity to generate new jobs, upskill researchers and build an everlasting reputation for excellence for the UK. This launch serendipitously coincides with

the recent release of the government's Life Sciences Vision, which we believe is exceptionally well aligned to the strategy and the capabilities being cultivated throughout our expanding network. Consequently, the Harwell Campus and the HealthTec Cluster is in prime position to help deliver many of the core goals of the UK, while also supporting the UK's recovery and Pandemic Preparedness.

In particular, the exceptional resources, programmes and the new anchor institutes, such as the Rosalind Franklin Institute, VMIC, Nucleic Acid Therapy Accelerator, MRC Advance training centre and MRC Mouse Genetics Network, will facilitate rapid growth of these sub sector specialities in terms of training, research, preclinical and clinical validation, manufacturing and commercialisation; benefiting the UK economy and especially job creation. Such national hubs will aid innovation, support, co-develop and troubleshoot common problems faced by the industry, thereby streamlining the development process, de-risking commercialisation and enhancing the UK's reputation as a world leader in vaccines, nucleic acid therapies, next generation imaging and analytics. In addition by working as a national hub & spoke collective, expertise will be shared, increasing upskilling in upcoming fields of research, with partners and patients benefiting around the country; helping to level up the country via a synergistic and holistic approach, which in turn will optimise resource and make full use of our capabilities as a nation.

The journey is just beginning.



Dr Adrian Hill, HealthTec Cluster Development Manager, Harwell Campus, STFC



Dr Barbara Ghinelli, Director, Clusters and Harwell Campus Business Development, STFC

Introduction

Throughout the world, advances in science and technology are transforming the way we live our lives. Innovations in medicine, biotechnology and associated fields of healthcare are often some of the most challenging, but equally have the greatest potential to be life changing. The life sciences sector hence needs to operate at the cutting-edge of technological developments and is increasingly dependent on the cross fertilisation of ideas across different fields.

'Manipulating the molecules of life in living organisms at the atomic level' Harwell Campus is home to a globally unique ecosystem founded on inter-disciplinary collaboration between physical and life sciences. Located within the Golden Triangle of Cambridge, London and Oxford, Harwell Campus is set to play an increasingly important role as a national hub.

By connecting pharma, biotech, medtech and agritech sectors with public health organisations, world-leading academics and members of the EnergyTec and Space Clusters on campus, new insights are shared, leading to innovative and disruptive technologies. Our extensive state of the art technologies and applications and unique imaging capabilities enable custom solutions to be offered, helping to accelerate research towards the clinic and into commercial outputs.

Driven by key Government investments associated with the Life Sciences Sector Deal and the collaborative and supportive environment, the Harwell HealthTec Cluster presents enormous opportunities for growth and impact for the UK economy.



A central UK partnering hub for the health and life sciences community

Since the HealthTec Cluster was launched in 2016 we've had several very successful years of development, with significant Government and private investment into new facilities, prominent stakeholders joining the cluster, and culminating with Harwell being designated as one of the Life Science Opportunity Zones by the Office for Life Sciences. The campus is now home to 60 organisations with over 1,250 staff working in life sciences, several of which develop and commercialise innovations that span more than one industry sector.

Harwell provides access to ~£3B of Government funded infrastructure, hosting advanced imaging and analytical technologies, including X-rays, muons, neutrons, IR, UV, lasers and other imaging modalities, and an array of research facilities offering next generation chemistry, biology, genetics and drug discovery, all within walking distance. Underpinned by significant computational power and expertise, large complex data sets can be interrogated, enabling the imaging, structural characterisation and analysis of virtually all substances, materials and living things.

To date the cluster has been built on the foundations of three core strategic themes aligned with the UK Industrial Strategy, namely Environmental Impact to Human Health, Drug Discovery and Ageing. These continue to lie at the heart of the cluster, but have evolved considerably into several specialty fields, attributable primarily to the addition of the Rosalind Franklin Institute, Vaccines Manufacturing and Innovation Centre (VMIC) and the Nucleic Acid Therapy Accelerator (NATA) initiative based at the Research Complex at Harwell. We continue to grow the capabilities and facilities on site and will soon welcome the Extreme

Photonics Application Centre and Natural History Museum Research Centre. Collectively these new additions represent the majority of the £800m recently invested in the campus, and will enable new insights into the complexities of disease at the cellular, molecular and atomic level.

This knowledge and enhanced understanding will create new tools for diagnosing illnesses earlier and more accurately, and new treatments for disease with improved efficacy in targeted patient populations. Industry partners will benefit from decreased drug candidate attrition and market-leading products, and ultimately people will live longer, healthier and happier lives.

Global market opportunity

In 2016, the global life sciences industry gross value was \$1.6 trillion and was expected to reach >\$2 trillion by 2023. The UK exported approximately £30.7 billion of Life Science goods and imported approximately £35.5 billion.

Currently the UK life sciences sector generates £80.6 billion of turnover and employs more than 256,000 scientists and staff.

'A community of experts that drive innovation, growth and scale-up'

The HealthTec Cluster is well positioned to support UK growth in core life science markets, increasing market share and maintaining global technological advantage, while also helping NHS sustainability. By developing unique capabilities at the leading edge of science within a campus that caters for incubation and scale-up, next generation products will disrupt the following targeted global markets:

Market	Forecast global value
Vaccines	\$105 billion by 2027
Medical imaging	\$46 billion by 2023
Infectious Disease Diagnostics	\$24 billion by 2025
Nucleic acid therapeutics	\$7.23 billion in 2024, at a CAGR of 33.3%
Cell and Gene Therapy	£11 billion by 2025.
Artificial Intelligence in Healthcare	\$31 billion by 2025 and \$170.5 Bn by 2028, with CAGR of ~42% from 2019

Our strategy

Our globally unique and cutting edge imaging capabilities and new facilities will enhance our ability to accelerate disruptive technologies from ideas right the way through to commercialization, for the benefit of patients, NHS and UK Plc. Such highly specialised technologies and large investments in national infrastructure cannot be easily replicated and hence must be accessible and open to all regions and researchers. We will bring to bear a powerful combination of skills in chemistry, biology, physics and engineering, and a mastery of imaging to interrogate a variety of diseases, the underlying biological mechanisms and the associated chemical reactions. By working with our external partners we will supplement our capabilities and knowledge base with specific therapeutic expertise, and apply targeted solutions at the animal, tissue, cellular and atomic level.

We will continue to develop our core sub-themes: advanced therapies, including vaccines, vectors and nucleic acid therapy; drug design, including preclinical studies and AI-enhanced technologies; and diagnostics and e-health. Physics and engineering, digital, data analytics and material science remain prominent cross cutting technologies to drive innovation,

and satellite communications, quantum, space technologies and environmental monitoring will be appropriately integrated to influence life science research in the coming years. These themes will continuously evolve and inform the direction of the HealthTec cluster, while also attracting more stakeholders to campus, creating critical mass around our anchor institutions, and generating productive partnerships and supply chains.

The resulting flow of knowledge exchange and increased skills base will further strengthen the cluster, enabling the advancement of research towards commercialisation and increased success in terms of funding and investment. The enhanced ecosystem will hence become an even more sustainable and world renowned hub for life sciences.

Our Vision

Ground breaking scientific and technological discoveries at the cellular and atomic level can change the way we visualise, manage and understand living systems and disease. Our cluster will continuously push discovery boundaries and fast-track the translation of novel ideas into tools and products that will bring huge benefits to patients, the UK economy and the global environment.

Our Mission

Grow the cluster by over 100 new companies over 10 years, generating more than 5000 jobs in the sector, and create internationally competitive scalable innovations in advanced medicines, devices and diagnostics, leveraging the Harwell Campus globally leading imaging capabilities and the brightest minds within specialised research institutes and partner organisations.

Our 5 point 10 year roadmap

The Harwell HealthTec Cluster will deliver a staged approach towards enhancing our position as a leading national and global hub for Life Sciences and achieving our objectives by 2031:-

1) Expand and strengthen a cluster community that is fully integrated in the wider campus to address global challenges and bolster the UK economy

Building on the existing National Laboratories brand and commitment to driving collaboration across the country, the Cluster will aim to attract like-minded organisations, industry and academic institutions to generate unique and targeted capabilities and strategic infrastructure. The focus will be to ensure integration of new members into the wider ecosystem as sub-clusters grow around the new facilities. This community will be best placed to develop joint funding bids and create initiatives and novel technologies to help combat unmet medical needs and solutions that support a healthier environment.

'Leveraging national infrastructure to solve global life science challenges'

2) The Harwell HealthTec Cluster will become a world gateway into the most advanced Life Sciences Imaging Capabilities

We will forge new national and international connections via the DIT and the LSOZ network. We will have a unified marketing and communication strategy for the cluster as a whole to expand existing relationships and create greater awareness. Being the front door to the most advanced imaging capabilities in the world will attract new research partners and inward investors to the UK.

3) Support company growth and scale-up to develop a sustainable UK supply chain anchored around campus assets

We will develop a multi-faceted and structured scale-up approach to help SMEs grow, translate and validate products, gain access to funding and investment, and partner strategically, to increase regional GVA and build a stronger supply chain for Life Sciences across the UK. We will aim to embed research collaborators from partner organisations within the campus and co-create mutually beneficial projects.

4) Support large corporates to deliver their vision

The cluster will work with large corporations to innovate and solve complex biological and chemical challenges, common and bespoke industrial bottlenecks, and projects that offer the greatest impact in terms of societal benefit.

5) Enhance the Life Science sector workforce to accelerate growth

As part of the wider Harwell Campus Skills Strategy, we will leverage the capabilities of campus facilities, institutes and centres to provide a comprehensive training environment to maintain and upskill a scientific and business talent pipeline.

4 growth pillars

To enable rapid growth across the cluster and maximise opportunities for the UK, we will need to operate beyond fundamental R&D and create a functional pipeline through to commercialisation. New incubation and scale-up accommodation will be important enablers, and greater connectivity, collaboration and access to facilities and lab space will represent key differentiators for this HealthTec cluster.

Early stage R&D:

Providing greater access to scientific and

business support will help de-risk and develop disruptive products, services and therapies. Initially this shall include enhanced mechanisms to engage with our globally unique facilities, such as the Diamond Light Source and an array of imaging modalities suitable for all life science and material applications at the STFC Rutherford Appleton Laboratory, specialised capabilities at Research Institutes and shared laboratory facilities on campus, as well as bringing together industrial and cross-sector partners to share insights and solutions. This includes leveraging UKRI funding, such as the cross-cluster Proof of Concept fund, signposting to alternative sources of finance and building an integrated community of business angels and venture capital firms and advisers. In the future this network will be linked with additional external facilities (UKRI, academic hubs, LSOZs) to enable further knowledge exchange and a more joined up approach to advancing UK Life Sciences. Collectively this will help provide a hands-on solutions-based approach to support our partners.

'Accelerating disruptive innovations to commercialisation'

Manufacturing:

The launch of the UK's Vaccine Manufacturing and Innovation Centre; a £158m large-scale GMP vaccine manufacturing and fill and finish facility, will enable commercial scale manufacturing of COVID vaccines and thereafter contract manufacturing for third parties.

Co-development of products with partners and clients will enhance workflows and optimise a variety of vaccine and vector-based technologies.

Similarly NATA will work with partners to troubleshoot the R&D and manufacturing processes for nucleic acid therapies.

Finally, as Harwell's 700 acre site can accommodate large scale buildings, further

bespoke developments, such as Oxford Nanopore's automated manufacturing facility and Agilent's flagship Ramen Spectroscopy Centre, will further enhance the campus with additional analytic, diagnostic and manufacturing capabilities.

Clinical Adoption:

Building on existing preclinical links and expertise, companies will be provided access to clinical infrastructure through the UKCRN, AHSN, the Clinical Biomanufacturing Facility at the University of Oxford and national Advance Therapy Treatment Centre network. Stronger relationships with specific hospitals will be developed aligned to therapy areas (e.g. Churchill Hospital for oncology).

Commercialisation:

Companies will have access to a unique network of UKRI advisors, manufacturing expertise, investment professionals, talent and financial services, as well as DIT International trade advisors via the LSOZ, to assist with commercialisation and attracting investment.



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