LIFE SCIENCES
Multidisciplinary Innovation in Healthcare
I participated in the “Accelerating Healthcare Innovation” conference at Harwell with Tim Peake and this highlighted the many collaborations required across multiple disciplines to keep humans healthy in space and on Earth.

Indeed advancements in all areas of healthcare are increasingly dependent on the cross fertilisation of ideas across different fields and this is one reason why I am so excited by the development of the HealthTec Cluster at Harwell. I am sure that this new Cluster will quickly become a world leading healthcare innovation hub exploiting the inter-disciplinary collaboration between physical & life sciences.

Within healthcare, Harwell already hosts 1,000 people across 40 organisations, many utilising the capabilities of the large “open access” facilities such as the Diamond Light Source Synchrotron or the Central Laser Facility’s “Octopus” for drug discovery and the development of biocompatible materials. Harwell is also home to Public Health England’s Centre for Radiation, Chemical and Environmental Hazards and the MRC’s Harwell Institute as well as the ISIS neutron & muon source.

The £103m investment in the new Rosalind Franklin Institute announced in February 2017, to be located at Harwell with up to 240 scientists linked to 10 major universities, will create a unique centre bringing together the UK’s strengths in the physical sciences, engineering and life sciences.

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Harwell is already home to a thriving ecosystem of innovative companies across a broad spectrum of emerging pharmaceutical/biotech, medtech, diagnostic, digital health and other areas of HealthTec.

I hope that many of you will join us here and become part of this exciting, fast growing innovative cluster.
HARWELL: AN OUTSTANDING CENTRE FOR SCIENTIFIC AND INDUSTRIAL INNOVATION
Advancements in healthcare are increasingly dependent on the juxtaposition of knowledge from different fields. The Harwell-HealthTec Cluster will be a world-leading healthcare innovation hub founded on inter-disciplinary collaboration between physical and life sciences. Areas of focus include, inter alia: ageing, drug discovery and environmental impact on human health.

The driving objective is to exploit Harwell’s unique combination of facilities and highly skilled people to boost healthcare growth and innovation. We will create an ever more vibrant ecosystem in which large and small companies can flourish and interact with brilliant academics and public sector researchers to exploit and commercialise advances in research and technologies.

The Harwell Science & Innovation Campus is focused on helping companies seize the benefits of “Collaborative Advantage” with multi-disciplinary collaboration across different sectors being encouraged and actively facilitated not only across campus but also nationally and internationally.

“The HealthTec life science cluster benefits from the very strong specialist investor network that exists in Oxfordshire and will reach out more broadly to the south-east and internationally. The vision of the physical growth of the cluster on the campus is guided by an overall masterplan that ensures coherent development. Harwell Campus is already working alongside HealthTec Cluster organisations that are expanding their operations by offering them a range of accommodation options, including bespoke solutions, within a flexible and attractive environment. The overall masterplan includes 500,000 sq ft of specialist accommodation for the Life Sciences/HealthTec Cluster. HealthTec will operate alongside the highly successful Space Cluster at Harwell, exploiting common support mechanisms and benefiting from the cross-over of knowledge, skills and disruptive technologies with Space Cluster organisations that include ESA’s European Centre for Space Applications and Telecommunications (ECSAT), the Satellite Applications Cluster and Harwell facilities and large companies to rapidly exploit and commercialise advances in research and technology.

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“...A CREATIVE AND INSPIRATIONAL ENVIRONMENT, BACKED UP BY COMMERCIAL KNOW-HOW...”
HARWELL MEETS THE ATTRIBUTES OF A SUCCESSFUL CLUSTER

The UK has a world renowned heritage in life sciences. Our life science sector has a global impact on societal health challenges such as the ageing population, cancer and sedentary lifestyles. Life science innovation and IP creates jobs, facilitates healthcare and augments growth.

GSK has benefited from engagement with the specialists at the world leading research facilities at the Harwell Campus. We have found the experts there to have an industry friendly approach to working with us, which accelerates innovation within our drug discovery programmes. We view the growing Health Tec cluster at Harwell as playing an increasingly important part in the UK’s innovation landscape.

Dr Malcolm Skingle
Director of Academic Liaison, GSK

Adjacent is the world-class University of Oxford, together with excellent links to top universities around the UK, many of whom have a physical presence on the Campus

• Oxford University ranked World No.1 in clinical and health and World No.3 in life sciences
• Rosalind Franklin Institute linked to 10 major universities
• 30+ universities have people on site

Critical mass of companies and science
• Over 200 R&D related organisations on site
• Over 250 companies in Oxfordshire’s BioPharma Cluster

An outward-facing culture and engagement with industry
• Leading industry engagement with Diamond’s customer base including; GSK, AstraZeneca & Pfizer
• 50 nationalities on site every day

A multi-talented workforce
• 49% of Oxfordshire workforce educated to degree level, well above the national average of 36%

World-class core science infrastructure
• Diamond, CLF, ISIS, MRC
• Strengthened by arrival of RFI

Pro-active collaboration
• Regular ‘Connect Harwell’ events actively foster the collaborative advantages available on site and other cluster-specific networking events

Accommodation and expansion space
• 710 acre site
• Phase 1 already well underway 400,000 sq ft
• Labs, offices & technical space
  – Further amenities underway & planned
  – New restaurant and 2nd hotel
• Reserve land alongside for your expansion
• RFI links 240 scientists to 10 universities
• University quarter 200,000 sq ft planned

Access to finance
• Top tier funds based locally (WIM, Invesco, OSI)
• Multiple sources of established early stage money

An attractive place to live and work
• Hundreds of affordable homes being built on site for sale or rent

Dr Malcolm Skingle
Director of Academic Liaison, GSK
Harwell is home to the UK’s world-leading national physical sciences laboratories representing an investment of over £2 billion to date.

Capabilities range from genetics and genomics, cellular and structural biology to pharmacology, big data, space technologies, advanced materials and engineering. These rare “open access” facilities and associated skills, provide a powerful platform to help accelerate innovation using leading-edge new technologies and applications, taking advantage of opportunities for collaboration between partners from different disciplines to inspire fresh thinking. Please come and let us surprise you by just how much is on offer at Harwell.

“Genuinely “open access” facilities looking to engage in solving complex problems for both academics and companies.”

1,200 STFC staff support the work of 10,000 scientists and engineers.

“Dr Fiona Marshall
CSO, Heptares Therapeutics

Our pioneering research is greatly enhancing our ability to apply a structure-based approach to drug discovery across a wide range of GPCR targets with strong clinical validation, but which have proved difficult or impossible to access previously. Access to Diamond’s crystallography beamlines remains critical for our work and the synchrotron’s developments in areas such as microfocus crystallography and membrane protein research will further strengthen the UK’s position as a leading contributor to structural biology research globally.”

Diamond Light Source is the UK’s synchrotron. It harnesses the power of electrons to produce light 10 billion times brighter than the sun that scientists can use to study anything from fossils and fuels to viruses and vaccines.

Diamond plays a major international role in biomedical research. A significant amount of Diamond’s scientific output springs from scientists who are working on a wide range of challenges from infectious disease treatments and drug resistance through to cancer research.

“AstraZeneca has been closely involved with Harwell for many years, not only with the Diamond Light Source for advanced X-ray crystallography but also increasingly in exploring multiple collaborations involving new disciplines and technologies.”

Dr Louise Leong
Director, Science Relations, AstraZeneca

“Some of the areas covered include:

• Infectious diseases
• Cancer research
• Neurodegenerative research
• Drug resistance
• Drug design
• Vaccine design
• Biomaterial design and imaging
• Radiation biology

The facilities and capabilities accessible through Diamond include:

• Protein crystallography for containment level 3 pathogens - unique in Europe
• First in the world national facility with Cryo-EM imaging for single particle and tomography
• XChem facility - fragment based drug discovery with high throughput (>700 crystals per day)
• Microfocus crystallography able to handle tiny and fragile samples
• X-ray microscopy at the cellular and subcellular level closing a resolution gap that exists between electron microscopy and conventional light microscopy, allowing acquisition of tomographic data from both native and fluorescent-labelled samples
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The Central Laser Facility (CLF) at the STFC Rutherford Appleton Laboratory is one of the world’s leading laser facilities, providing scientists from the UK and Europe with an unparalleled range of state-of-the-art laser technology and expertise across the scientific disciplines.

Richard Hitchman
Evotec

The use of the Octopus imaging suite at the Central Laser Facility (CLF) for confirmation of expression and membrane protein trafficking serves as a key step for membrane protein QC. A recent study is working towards the elucidation of the mTOR structure. This collaboration brings together CLF’s experience and technology, along with Evotec’s structural biology platform for elucidating signalling pathways and to identify new paths for drug discovery.

At the CLF there are state-of-the-art laser imaging systems suitable for innovative life and physical science research.

Artemis
Artemis is the CLF’s facility for ultrafast XUV science. Experiments on Artemis investigate ultra-fast electron dynamics in condensed matter and gas-phase molecules.

Gemini
Gemini is an extremely high power, ultra-short pulse laser system delivering dual beams of 15 J, 30 fs laser pulses, at a rate of one shot every 20 seconds, focused to intensities in excess of 10$^9$ W cm$^{-2}$.

Octopus
Octopus (Optics Clustered to DupLet Unique Solutions) imaging cluster offers a range of imaging techniques including multidimensional single molecule microscopy, confocal microscopy and optical profilometry.

Ultra
Ultra combines laser, detector and sample manipulation technology to probe molecular dynamics on the femtosecond to microsecond timescales.

Vulcan
Vulcan is a petawatt laser system, used for experiments researching High Energy Density (HED) science including fusion energy, electron and ion acceleration, laboratory astrophysics and plasma physics.

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The use of neutrons and muons as probes bestows capabilities complementary to those of synchrotron sources like Diamond, which uses photons of light. This includes sensitivity to biological material through the signatures of hydrogen and carbon.

The ISIS neutron and muon source supports a national and international community of more than 3,000 scientists for research into subjects ranging from the environment, pharmaceuticals and healthcare, through to nanotechnology and beyond. ISIS has also been used to study, at the molecular level, the mechanism of antimicrobials targeted at particular fungal infections.

Dr Andrew Taylor (Executive Director of the National Laboratories) and Professor Liu Conqiang (Vice President of the National Science Foundation of China), Royal Greenwich Naval College, London 2015.
MRC Harwell Institute

The MRC Harwell Institute is at the international forefront of the use of mouse genetics to study the relationship between genes and disease, from the earliest stages of development to diseases of ageing. They are a key player in the International Mouse Phenotyping Consortium (IMPC), a global project that aims to find a function for every protein-coding gene in the mouse genome and make the data freely available to other scientists via the IMPC portal.

Their international datacentre collects and quality controls large amounts of biomedical research data from the international partners of IMPC and develops statistical analysis and methods of on-line display and searches. They also have a portfolio of research programmes to advance medicine through cutting-edge research into the genetic basis of disease.

Public Health England

Public Health England (PHE) exists to protect and improve the nation’s health and wellbeing, and reduce health inequalities. Organisations that now provide PHE’s radiation protection functions have been located on the Harwell site since the 1970s.

PHE’s Centre for Radiation, Chemical and Environmental Hazards at Harwell focuses on public health with regards to the environment. As an executive agency, sponsored by the Department of Health, PHE is, amongst other things, responsible for:

- Making the public healthier by encouraging discussion, advising government and supporting action by local government, the NHS and other people and organisations
- Protecting the nation’s health through the national health protection service, and preparing for public health emergencies
- Researching, collecting and analysing data to improve our understanding of health and come up with answers to public health problems
- Helping local authorities and the NHS to develop the public health system and its specialist workforce

PHE’s Harwell building also houses the Thames Valley Health Protection team. PHE meets its responsibilities through the development and conduct of world-class science, provision of knowledge and intelligence, advocacy and advice, through facilitating partnerships and by providing specialist public health services.

Simon Bouffler
Head of Radiation Effects Department, Public Health England’s Centre for Radiation, Chemical and Environmental Hazards (CRCE)

doctors.org.uk

“PHE’s Harwell site location provides us unique opportunities to establish and develop multidisciplinary collaborations to address many of the current concerns in environmental and wider public health.”

The areas of research at the MRC Harwell Institute include:

Large-scale functional genomics
- International Mouse Phenotyping Consortium (IMPC)
- CRISPR/Cas9

Lifetime studies
- Disease model discovery
- Genetics and pathobiology of deafness
- Genetics of type 2 diabetes
- Neurobehavioural genetics
- Genetic disorders of sex development
- Cilia, development and disease
- Neurodegenerative disease
- Neurological disease

Translational studies
- Genetics of otitis media
- Genetics of type 2 diabetes

Data analysis and dissemination
- Biocomputing
- Statistical genomics

MRC Harwell also delivers many services including Genome Editing Mice for Medicine (GEMM) a bespoke genetically modified mouse service for UK Science. Other services include genome engineering, husbandry and phenotyping, pathology and bioimaging, and archiving and distribution.
THE NEW ROSALIND FRANKLIN INSTITUTE

In February 2017 the UK government announced the decision to build the £100m Rosalind Franklin Institute (RFI) on the Harwell site. This transformational project, named after the one of the UK’s most well known female scientists, brings together Industry including large Pharma, Biotech and Instrument manufacturers.

The goal is to drive disruptive innovation in the life sciences through entirely new technologies in physical science.

The RFI will be a joint venture of the UK’s leading Universities including Oxford, Imperial College, UCL, Birmingham, Manchester, Southampton, Leeds, Cambridge, Kings College London and Edinburgh. The RFI will combine a new central Hub at Harwell with spokes at these partner universities.

In its early phases the RFI will focus on five scientific breakthrough areas; (i) the coherent imaging of life from atoms to organism, the focus being to develop and integrate new technologies to see life at all scales and thus revolutionise our ability to treat complex disease; (ii) the creation of new approaches to using light and sound to image tissue will transform the diagnosis of tumours, joint damage and heart problems; (iii) driving the innovation that will deliver the next generation of medicinal chemistry; the molecules that make people better. The UK has a rich history of pharmaceutical discovery but to retain and enhance our leading role we need to focus on going beyond current approaches; (iv) mass spectrometry enables not only the analysis of proteins but can also detect metabolites, thereby helping us understand drug action and even in discovering new drugs. The RFI will support efforts to build the next generation of such machines that will reach deep into the clinic and into the lab; and (v) the final theme is the use of X-rays and developing new detector technologies to catch up with the revolution in X-ray sources. The Diamond Light Source, which is adjacent to the RFI, determines the structures of thousands of proteins and a next generation detector will enhance that ten fold. The UK X-ray Free Electron Laser hub will be based within the RFI. X-ray Free Electron Lasers deliver immense power in very short pulses (femto seconds 10^-15). This exciting new technology is just beginning and the RFI will be there from the outset.

THE RESEARCH COMPLEX AT HARWELL

Many of the most important advances in science take place at the interfaces between traditional disciplines and frequently used large central facilities. The Research Centre at Harwell (RCaH) provides the environment and facilities for researchers in the life and physical sciences to undertake research across such traditional barriers, and encourages synergy between these areas of UK research excellence. It is especially targeted at researchers who will conduct work at the Central Laser Facility, Diamond and ISIS and other shared facilities on the Harwell Campus.

The Central Laser Facility’s ULTRA and Octopus facilities in RCaH are used for research across the life and physical sciences, for example studying how DNA is able to repair itself after damage, investigating how the growth of cells is controlled in health and disease, looking at how molecules capture light, and watching catalysts function in real time.

EUROPEAN SPACE AGENCY

The European Centre for Space Applications and Telecommunications (ECSAT) is the most recent addition to the European Space Agency’s operational sites across Europe. Approximately 100 people are based as ESA’s ECSAT centre in Harwell supporting activities related to telecommunications, integrated applications, climate change, technology and science. ECSAT focuses on the development of commercial space-based products and services, downstream applications and the ‘spin-out’ of space into non-space sectors. This includes the use of technology and micro-gravity research developed for human space flight.

Harwell Campus is also home to one of ESA’s Business Incubation Centres. The ESA BIC at Harwell is managed by STFC and provides an opportunity for startups to access world class scientific facilities and research. More than 55 startups have been nurtured at the BIC since 2011, addressing a wide range of markets.

“We are all struck by the tremendous opportunities for innovation that are arising from the cross-over of research in Space, Life Sciences and Physical Sciences. This is creating exciting prospects for the commercialisation of research in three areas in particular: the effects and mitigation of ageing; environmental impacts on human health; and new materials for the treatment of medical conditions.”

Magali Vaissiere
Director of Telecommunications & Integrated Applications, Head of ECSAT Centre

eos.int/ESA
The Satellite Applications Catapult is transforming the way the world uses satellite technology, enabling new business and improving people’s lives. Within the healthcare sector, we are working to maximise the contribution of satellites wherever possible and to boost the opportunities for UK organisations globally. This is in response to a shift in the day-to-day provision of healthcare, whereby digital solutions are playing an ever-greater role. Satellite technology can improve outcomes overall for health and wellbeing by enhancing and enabling both treatment and supporting services. Additionally, because satellites offer global coverage, they offer the opportunity to reduce local healthcare inequalities.

As just one of many application areas, the Catapult is using satellite communications to enhance healthcare provision in remote rural areas by boosting connectivity where robust and reliable service is essential – for example to deliver screening for inflammatory bowel disease, ultrasound scanning for strokes and diagnosis of foot ulcers in diabetics. “Always Connected” medical screening vehicles use satellites to send images from mobile breast screening vans to an NHS picture archiving and communications service (PACS). The service also provides access to appointment systems and key software applications. Based on this, several NHS Trusts are already moving to paperless working on their screening vans, with the objective of rolling this out nationwide and extending it to other programmes, such as MRI screening.

SATELLITE APPLICATIONS CATAPULT

HUMAN SPACEFLIGHT CAPITALISATION OFFICE

A recent addition to the suite of Harwell space organisations is the Human Spaceflight Capitalisation Office (HuSCO). HuSCO has been established to facilitate the commercialisation of human space flight-related activities in the UK and through augmented communication, coordination, collaboration mechanisms, increase the efficiency and effectiveness of grass roots activity in this field including the application of knowledge gained to human healthcare on Earth.

The office aims to provide a service to coordinate strategic community efforts and maintain appropriate liaison with Government agencies for the benefit of the UK space sector. HuSCO will work with other Harwell organisations and partners from across the UK and Europe to advance the translation of space life science benefits to terrestrial healthcare needs. In doing so HuSCO will support the use and exploitation of the space environment by terrestrial R&D teams to grow the UK science base, helping embed UK R&D within the international space and life science sectors.

RAL Space Spectroscopy Group develop unique and novel laser-based systems for environmental and atmospheric monitoring targeting very high performance needs.

This activity encompasses the development of concepts, demonstrators, prototypes, processing methods and algorithms, which leads ultimately to field deployment. The urgent need for novel high performance measurement systems relates to the threat posed by climate change and air quality and their understanding and possible mitigation. Instrument concepts developed by the team encompass in-situ miniature laser spectrometers, laser isotopic analysers, spectroscopic-lidar, open-path laser spectrometers, and laser heterodyne spectro-radiometers targeting greenhouse gas emission monitoring and pollutants and precursors monitoring.

One example of the group’s work is the concept of a quantum cascade laser heterodyne spectrometer that has been developed over the last few years and is currently being deployed as part of an international field measurement campaign taking place at the Finnish Arctic Research Station. The campaign aims to assess, cross-compare, and validate novel instrumentation for greenhouse gas emission monitoring to be part of the forthcoming global greenhouse gas observing system encompassing ground, airborne and space monitoring sensors.

RAL Space Spectroscopy Group

SPECTROSCOPY AT STFC RAL SPACE
Being at Harwell sets you in the heart of the ecosystem of the UK’s Science Vale, but most importantly gives access to the leading edge resources of the STFC both in terms of facilities such as the clean rooms and, more importantly, the people. For us this has decreased the cost of R&D but more importantly decreased the risk and accelerated timescales as well as promoting our visibility.

Mark Evans
CEO, Adaptix
AgaMatrix has developed the WaveSense JAZZ Wireless; a blood glucose meter that automatically syncs glucose results to the AgaMatrix App and enables patients to share their data with family members or healthcare professionals in just seconds.

AgaMatrix has been at the forefront of developing connected solutions for diabetes management and continues to take an innovative approach by working closely with Oxford University on further app developments.

Element Six is a global leader in the design, development and production of synthetic diamond super-materials for industrial applications. Providing solutions for industries such as automotive and consumer electronics manufacturing, mining and road planning, and oil and gas drilling. Element Six is also opening up new applications synthetic diamond in a wide range of industries such as optics, power transmission, water treatment, semi-conductors and sensors.

“Element Six arrived at Harwell with over 100 R&D people four years ago and we have already engaged in six unexpected new exciting business collaborations with complementary technology groups across the campus.

An emerging area of research is the applications of nanodiamonds in life science industries, including drug delivery, bio-imaging, bio-sensor, and tissue engineering. Element Six is actively looking for partners in this field to enhance its research capacity, market exploration, and product development.”

Neill Hunt, Head of Innovation Projects Office, Element Six (a De Beers Group company).

The Electrospinning Company designs, develops and manufactures advanced biomaterials for use in implantable tissue-regenerative devices. The company supplies the first electrospin material to be incorporated into an FDA-approved medical device that promotes endogenous tissue repair in orthopaedic surgery, and is building a pipeline of customer projects in a range of indications.

The Company, established in 2010 as a spin-out by the STFC, is located in clean rooms at the Rutherford Appleton Laboratories Harwell Campus, and has achieved ISO 13485 medical device quality certification.

Karus is a leader in the design and development of innovative cancer therapeutics. The company’s orally-active, small-molecule drugs combine targeted cancer cell activity with immunotherapy for the treatment of haematological and solid tumors.

Karus has taken a concept-to-clinic approach, having designed and developed its therapeutic agents from research stage through to early stage clinical trials.
OxSyBio is developing 3D printing techniques to produce a range of tissue-like and functional tissues for medical research and clinical applications.

The company’s vision is to produce tissues that can be used in the clinic for organ repair or replacement. The technology is based on a method of printing tissue-like materials comprised of 3-dimensional networks of lipid monolayer aqueous droplets which was featured on the cover of Science in April 2013. These materials were shown to be capable of conducting electrical signals along pre-defined pathways, and self-folding to form complex geometries.

STFC’s sponsorship of the OxSyBio and MRC scientific collaboration has enabled the 3D printing of a brand new disease model for obesity and diabetes.

We are intending to continue and deepen this collaboration that would not have been possible without STFC’s support of cross-disciplinary work and the unique character of the STFC Harwell Campus.

Dr. Hadrian Green
CEO, OxSyBio

OXFORD NANOPORE TECHNOLOGIES

Oxford Nanopore is behind the world’s first and only portable DNA sequencer, the MinION. Used worldwide in thousands of labs, it takes biological analysis into the hands of scientists whether they are learning about infectious disease, human genetics, crop science, transcriptome analysis or many other areas of biology.

Beyond this, Oxford Nanopore aims to enable the analysis of any living thing, by any person in any environment. The food industry, agriculture, healthcare and consumers all stand to benefit from scalable, real time DNA sensors.

ResMed (NYSE:RMD) changes lives with award-winning medical devices and cutting-edge cloud-based software applications that better diagnose, treat and manage sleep apnea, chronic obstructive pulmonary disease (COPD) and other chronic diseases. ResMed is a global leader in connected care, with more than 2 million patients remotely monitored every day. Our 5,000-strong team is committed to creating the world’s best tech-driven medical device company – improving quality of life, reducing the impact of chronic disease, and saving healthcare costs in more than 100 countries.

ResMed UK Ltd has been based in Oxfordshire for 25 years and we are delighted to now be located on Harwell Science and Innovation Campus. From our new home we will continue to support the NHS and private patients through innovations, services, and solutions.

Gordon Sanghera
CEO, Oxford Nanopore Technologies

Harwell Campus is an exciting new chapter for ResMed UK. It provides our business with the ideal environment to continue our rapid growth and market leading position in the UK and Ireland.

Ewan Cuthbertson
Managing Director, ResMed

OXFORD MICROMEDICAL

Oxford Micro Medical Ltd utilises technology originally stimulated by the Rosetta Space Mission to develop a novel mass spectrometer for healthcare applications.

Taking advantage of the facilities available through the ESA Business Incubation Centre, the company is developing an innovative technology for the detection of helicobacter pylori - a stomach infection that is linked to cancer. As this potentially life-threatening disease is more prominent in developing countries, Oxford Micro Medical are using the precision workshops at the Space Science facility at Harwell to develop a cheap, portable device that can be carried to remote areas.

We are proud to manufacture our products in Harwell, one of the UK’s best centres of science.

Gordon Sanghera
CEO, Oxford Nanopore Technologies

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nanoporetech.com

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Oxford Nanopore is behind the world’s first and only portable DNA sequencer, the MinION. Used worldwide in thousands of labs, it takes biological analysis into the hands of scientists whether they are learning about infectious disease, human genetics, crop science, transcriptome analysis or many other areas of biology.

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COLLABORATIVE ADVANTAGE

In the years ahead the Harwell HealthTec/life science cluster will grow into a world-leading healthcare innovation hub founded on multidisciplinary collaboration between physical and life sciences focusing on preventative medicine practices and improving medical diagnosis and treatment through enhanced digital, e-health and remote healthcare capabilities.

HealthTec is an example of a regional cluster of national importance and reach. Clusters create critical mass within fields of endeavour shared by multiple organisations. Innovation occurs more readily where partners from different disciplines and sectors collaborate towards similar goals. Innovative R&D is being nurtured at Harwell, through the campus’ provision of support mechanisms, access to rare skills and facilities and active cross disciplinary communication and engagement mechanisms, such as the “Connect Harwell” initiative, cluster specific events and the development of field specific network organisations such as the Space Cluster and the HealthTec Cluster. In this way Harwell is making a unique contribution to the growth of both the UK’s science base and the national economy.

A recent and successful example of positive life science/healthcare development is the HealthTec ‘proof of concept call’, which provided small amounts of feasibility funding to 12 successful proposals for the development of R&D. This ranged from the development of novel in situ X-ray diagnostic capabilities to 3D printing models of organic tissue, to a satellite-based real-time UV measurement system for personal health. Examples of cross disciplinary collaborations between organisations on and off site, which have emanated from HealthTec’s recent “Proof of Concept” (PoC) call include those between Lockheed Martin and MRC, SiHealth and PHE and Kayaer Space and Harwell’s Central Laser Facility.

Working with Harwell HealthTec Cluster has allowed Drayson Technologies to extend collaboration opportunities beyond environmental monitoring. In innovative digital health & multidisciplinary projects.

Dr Diana Stefan
Head of Sensor Technologies, Drayson Technologies

HealthTec has opened doors that allow us to design novel applications that can link Space technology to individual health benefits.

John Auburn
Strategic Advisor, RHEA group

The treatment of disease is often hampered by a lack of understanding of the way in which complex biological processes influence the development of disease in individual patients. Being able to predict and monitor the progression of major diseases, and to use this information to develop “personalised medicine”, could offer improved outcomes for patients, whilst reducing costs for health services.

A £1.7m grant from the Medical Research Council (MRC) is bringing together the CLF, the Research Complex at Harwell (RCaH) and MRC Harwell to improve our understanding of diseases such as cancer, and other medical concerns such as deafness and ageing. The UK Astronomy Centre (UK ATC) in Edinburgh is also a collaborator, aiding in the development of adaptive optics for super-resolution microscopes. The development of adaptive optics solved a problem in astronomy research, where the ‘twinkling’ of stars (caused by atmospheric distortion) makes it hard to get a clear image. The murky environment within cells causes similar problems, and adaptive optics can help get a clear picture here as well.

Working with Harwell HealthTec Cluster has fundamentally enhanced the development of our product and company. It has provided the opportunity to work with a leading design agency and conduct in depth user research to provide a robust foundation for our ongoing growth.

Nick de Pennington
Managing Director, Head of Sensor Technologies, Ufonia

The HealthTec PoC funding has fundamentally enhanced the development of our product and company. It has provided the opportunity to work with a leading design agency and conduct in depth user research to provide a robust foundation for our ongoing growth.

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Managing Director, Head of Sensor Technologies, Ufonia

Lockheed Martin is excited to be working with MRC Harwell to explore the prospects for medical research in Space, exploiting the potential of this growth area of the low Earth orbit economy. The HealthTec Cluster, with its broad range of capabilities, is an ideal place to develop innovative new ideas like this.

Stephen Gibson
Head of Space, Lockheed Martin UK Ampthill

The HealthTec PoC funding has fundamentally enhanced the development of our product and company. It has provided the opportunity to work with a leading design agency and conduct in depth user research to provide a robust foundation for our ongoing growth.

We have benefited from the experience and investment at Harwell that would have taken us years to develop alone. We felt part of the science community there and look forward to building our business in partnership with Harwell in the future.

Dr. Lee Smith
Anglo Biopharma Ltd
The Harwell Science & Innovation Campus, 16 miles south of Oxford, covering 710 acres with 5,500 people across 200+ organisations has embarked upon an ambitious expansion plan with millions of square feet of new working & research space. Importantly this will be supported by hundreds of new homes targeted at people working on site together with improved on site amenities.

Within this overall masterplan, during 2017 planning permission will be sought for a new 500,000 sq ft expansion of the life science/HealthTec cluster sited close to the major facilities at its core.

There are many options available for the entire spectrum of SME’s to major multi-nationals looking to relocate to Harwell. We have the flexibility to offer highly cost effective space within new buildings (+ Enterprise Zone benefits); or bespoke new buildings with planning in place; or for larger groups the ability to create your own “Campus on a Campus” with land reserved alongside for future expansion.

The ambition of the Harwell Campus expansion is matched only by that of the many brilliant researchers and scientists who call the Harwell Campus home.
Oxfordshire is the best region of the UK for emerging life science/HealthTec companies to raise funds. Harwell lies at the heart of the Oxfordshire-Thames Valley region which is one of the largest life science clusters in Europe with around 650 life science companies across pharma, biotech, diagnostics, medtech and digital health.

Many of the most important investors into emerging life science companies are local:
Invesco Perpetual, Woodford Investment Management, and Oxford Sciences Innovation.

Other close investors include:

Business support is provided via proactive business development initiatives to link companies to the “open access” science facilities on site as well as to other complimentary technology companies through “Connect Harwell” and with the NHS through our close partnership with the Oxford Academic Science Network.

The Harwell Campus partnership exists to provide you not only with the perfect, cost-effective, property solution but also is here to help you access funding faster and to open doors to new value – add commercial partners and technologies.

Gordon Duncan
Partner, Harwell Campus

FUNDRAISING BY LOCATION

Source: E&Y

<table>
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<th>Value ($m) per location</th>
<th>Oxfordshire &amp; Thames Valley</th>
<th>London</th>
<th>Cambridge &amp; East Anglia</th>
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Gordon Duncan
Partner, Harwell Campus

SUPERB TRAVEL LINKS

Travelling to and from Harwell Campus is easy. Next to the A34 the Campus lies just 16 miles from Oxford, offering easy access to the UK’s two largest cities – London and Birmingham – via the M40 and M4 motorways. It is also less than a forty minute drive from London Heathrow Airport, the UK’s premier hub airport.

Heathrow will be faster by rail with the addition of Crossrail in 2018, as well as quicker journeys to other areas of London.

Frequent direct trains from nearby Didcot Parkway station take around 45 minutes to London Paddington or Bristol Temple Meads and 15 minutes to Reading.

The Campus has its own bus station with direct links to Didcot (including Didcot Parkway), Wantage, Abingdon, Oxford, Newbury and surrounding towns and villages. A new express Science Shuttle has recently been introduced for staff and visitors travelling between the University of Oxford Campus and Harwell.

ACCESS AND PARKING

All buildings are easily accessible by road, with parking adjacent and nearby.

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Whether you are interested in a small 5,000 sq ft local team office or 500,000 sq ft bespoke offices, laboratories and production facilities, the Campus team at the Harwell Management Office would be delighted to talk to you about how Harwell can contribute to your success.

We can help you to engage the skilled people that you need, discuss how to access the scientific equipment and knowledge at Harwell, and tell you everything you need to know about moving to our world-class science and innovation campus.

The best way to appreciate the breadth and depth of the facilities and opportunities at Harwell Campus is to visit us.

Harwell Management Office
Atlas Centre, Fermi Avenue, Harwell Campus
Didcot, Oxfordshire, OX11 0QX

Dr Barbara Ghinelli
barbara.ghinelli@stfc.ac.uk

Gordon Duncan
gbd@harwellcampus.com

Dr Deborah Spencer
deborah.spencer@stfc.ac.uk

Angus Horner
akh@harwellcampus.com

harwellcampus.com
twitter.com/HarwellCampus