BRILLIANT BUILDINGS

PEARS BUILDING

A design for life

How a collaborative building is helping to make the UK a world leader in fighting diseases

1. INTRODUCTION

Medical advances and better ways to treat patients are crucial in the fight against disease – and the odds swing more in favour of scientists and doctors if they can talk regularly and easily with each other.

This was the motivation for the Royal Free Charity to bring together senior managers at the Royal Free London NHS Foundation Trust and UCL to take their close working relationship to new heights with a world-class centre of excellence for studying the human immune system.

Positioned next to the Royal Free Hospital in Hampstead, the centre would provide a new home for the researchers at the UCL Institute of Immunity and Transplantation.

The aim was that close proximity would foster a symbiotic culture in which scientists and medics could learn from each other, thereby accelerating the development of new drugs and treatments for patients. The new building would enable the Institute to expand to include 200 scientists in what would be the only research facility of its kind outside the USA – and one of only five in the world.

It was named the Pears Building, in acknowledgement of the very substantial donation made by the Pears Foundation – a large philanthropic body.

Such an important facility for the world of science required a contractor with a long track record of delivering successful healthcare projects. It was decided that Willmott Dixon was just the company and it was appointed to construct the Pears Building.

This was no ordinary build process and the arrival of the Covid-19 pandemic in early 2020 could have severely impacted the project. However, the team adapted site processes in line with government guidance and work carried on safely throughout the pandemic. The Pears Building opened in October 2021 to acclaim from scientists, doctors and patients.

This is the story of how the Pears Building came to be.

WILLMOTT DIXON
SINCE 1852

Anastasia Chrysafi, national account manager, Healthcare, Willmott Dixon

2. PROJECT OVERVIEW

A good neighbour
The site was adjacent to a school, church, hospital and many residential properties. Willmott Dixon's traffic plan managed the movement of 16,000m3 of spoil (more than 4,000 traffic movements) from the site through a single road exit onto a narrow street with minimal impact on people and local businesses.

Health and safety
The site was very safe, recording more than 540,000 people hours worked and 2,600 different visitors and operatives through the site gates. There was one minor accident involving a worker, who subsequently returned to site very quickly.

External façade sequencing
The precast concrete banding which occurred at floor levels to the main elevations was securely fixed to the slab edges with stainless steel bracketry. These formed the sills and lintels to the full-height windows, and supported the brickwork panels either side of the windows.

Treading lightly
Willmott Dixon is very committed to ensuring its projects and activities are as sustainable as possible. The Pears Building was no different, with 99% of waste diverted from landfill. In one example, underground concrete obstructions were excavated, crushed and re-used on site, so that limited new materials were required.

Water table build-up
A specialist engineer was commissioned to develop an innovative groundwater collection system to protect the building sub-structure. The system was installed below ground and between the contiguous piles. It was designed to fill up with water via a series of perforated pipes and then drain into the building drainage system.

"HAVING RESEARCHERS, DOCTORS, NURSES AND PATIENTS ALL IN THE SAME PLACE AND FOCUSED ON TESTING NEW MEDICINES IN CLINICAL TRIALS MEANS WE CAN BRING NEW TREATMENTS TO PATIENTS MUCH FASTER."

PROFESSOR HANS STAUSS, DIRECTOR OF THE UCL INSTITUTE OF IMMUNITY AND TRANSPLANTATION

Key outcomes

Construction began on the Pears Building in 2018 with a project value of £48.9m. The facility was handed over in June 2021, providing more than 6000m^2 of the best possible infrastructure for research, training and clinical delivery.

The building allows scientists from UCL and clinicians from the Royal Free Hospital to work together in an on-site research centre for the first time. This will significantly speed up the research and clinical trial process that leads to new treatments for patients.

The Royal Free Charity raised £2 for every £1 of public money.

The work programme was adapted to ensure construction could continue safely during the Covid-19 pandemic.

The seven-storey structure is comprised of two levels of basement car park and office space, three levels of Containment Level 2 laboratories – including a Containment Level 3 laboratory space – and patient accommodation on the top two floors.

The building achieved BREEAM Excellent rating.

3. THE BRIEF

One of the unusual aspects of the Pears Building was that the customer comprised of three organisations: the Royal Free Charity (RFC), UCL and the Royal Free London NHS Foundation Trust.

The RFC exists to support the patients, staff and researchers of the Trust's three hospitals: Barnet Hospital, Chase Farm Hospital and the Royal Free Hospital.

It works alongside hospital colleagues to understand where the charity's investment is most needed to improve lives. Each of the three stakeholders had a vision for the Pears Building, but it was the fundraising efforts of the RFC which ensured it could be built.

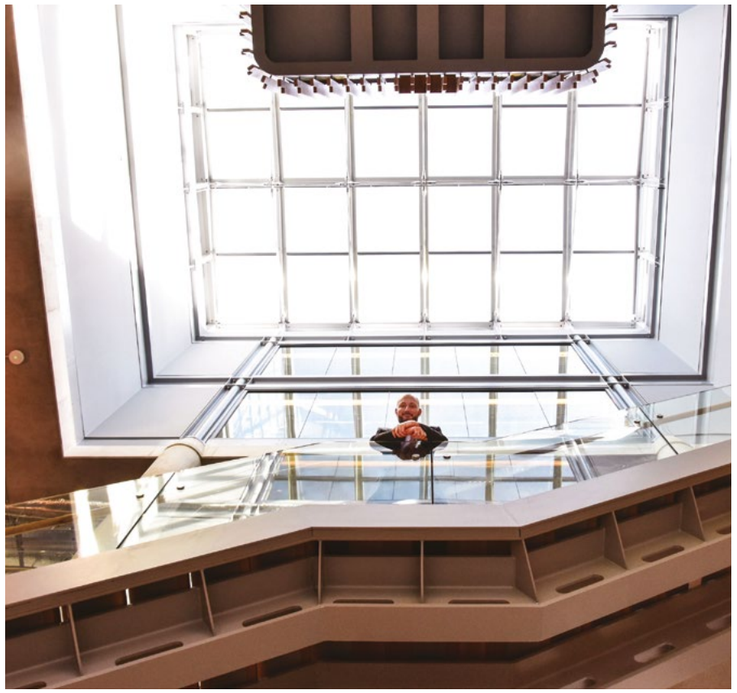
Scientific impetus

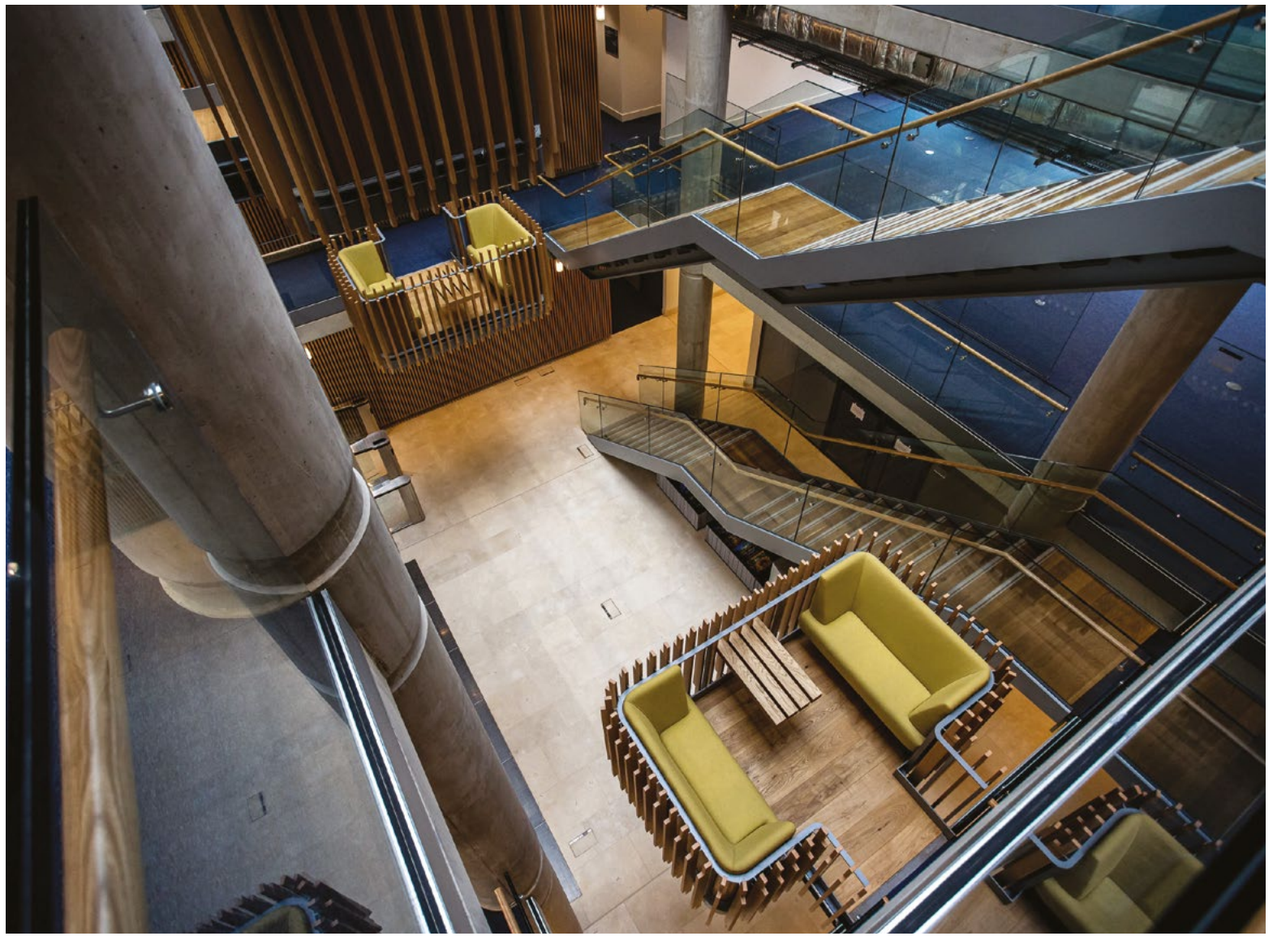
Long before the financial foundations were in place, the scientific impetus for the centre came from Professor Hans Stauss, director of the UCL Institute of Immunity and Transplantation (IIT).

The world-renowned immunologist began nurturing the concept for the research centre in 2008 and describes the Pears Building as "my baby".

Explaining his motivation, Professor Stauss says: "There had always been research links between UCL and the Royal Free Hospital, but never an on-site research centre – and if we were to accelerate treatments, it was very important that there was one.

"At present, it takes more than 15 years for research discoveries to lead to new treatments for patients. Having researchers, doctors, nurses and patients all in the same place and focused on testing new medicines in clinical trials means we can bring new treatments to patients much faster."





Left and above: The extensive use of concrete in the construction of the building helped to achieve the exceptionally tight vibration requirements necessary for world-class laboratory facilities, while ducting in the ceilings was left exposed to increase the sense of space. **Right:** Matt Adams, Willmott Dixon's senior operations manager for the Pears Building in the light-filled atrium.

Phase one of bringing UCL and the Royal Free London NHS Foundation Trust closer together was to develop a 1,000m^2 facility, which opened in 2013 inside the Royal Free Hospital building.

"That was a very important milestone, and immediately after that we targeted the government's Strategic Infrastructure Fund, which was set up to enhance UK science," says Professor Stauss."With that secured in principle, the Royal Free Charity agreed to raise money for the additional funding we'd need – as for every £1 of public money, £2 needed to be raised."

Clear vision

Professor Stauss worked tirelessly in assisting the RFC's fundraising efforts, approaching a range of philanthropists and wealthy individuals. There were even a few dinners at Buckingham Palace, where he was able to explain to a very select gathering how important the new centre would be and how vital it was that the funds be found.

Professor Stauss was also closely involved in the process of selecting Hopkins Architects to design the building. He told them there were two principles for the building.

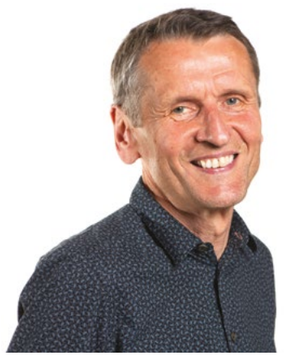
"Firstly, it needed to serve as an interactive space for people. It must involve the community – to get away from the idea of scientists as detached from everyone else and a bit weird! So I wanted very open spaces and boundaries – atrium, and a café open to the public.

"Secondly, I said it needed to be a high-quality work environment that feels spacious. I didn't want false ceilings – instead, exposed ductwork. And I wanted each floor space divided into two halves: the research labs – which need to be Containment Level 2 for biosecurity – and the other half to be interactive and sociable, with food and drink allowed. We also needed to have specialist areas, for example for Covid (Containment Level 3)."

Design approach

As a result of the input from Professor Stauss and his colleagues – notably Professor Emma Morris, and peers at the Royal Free Trust and the RFC – Hopkins Architects designed a seven-storey building to be constructed alongside the hospital on a disused car park.

The building was to comprise of two levels of car parking for patients and visitors and office space for the RFC, three levels of Containment Level 2 laboratories – including a Containment Level 3 laboratory space – and accommodation for patients on the top two floors.



"IT NEEDED TO SERVE AS AN INTERACTIVE SPACE FOR PEOPLE. IT MUST INVOLVE THE COMMUNITY – TO GET AWAY FROM THE IDEA OF SCIENTISTS AS DETACHED AND A BIT WEIRD!"

PROFESSOR HANS STAUSS, DIRECTOR OF THE UCL INSTITUTE OF IMMUNITY AND TRANSPLANTATION

4. COLLABORATIVE PROCESS

In early 2016, the Royal Free Charity awarded Willmott Dixon the design and build JCT contract, procured through a two-stage tender.

However, the start was delayed because a local objector had stated that the scheme would affect the church and school located near the site. The project could not proceed until a judicial review had been completed.

The objections were not upheld, but a number of challenging restrictions were placed on the building team. This included a ground monitoring system to ensure work would stop if the surrounding environment was affected while the basement was being excavated.

Work on the project was finally due to begin in early 2018, but due to the delay, Willmott Dixon's initial tender required repricing to allow for the inevitable inflation and increase in the price of materials. Working collaboratively over a period of four weeks, company and customer quickly agreed the repricing of the entire contract.

Bringing the designs to life

The building designer, Hopkins Architects, was retained by the RFC to guide the project. Willmott Dixon brought architects BMJ on board to develop Hopkins' concept design.

BMJ had worked previously with Willmott Dixon at Warwick University and with UCL. As Helen Gamble of BMJ explains: "Hopkins had set out the design intent and we then made sure it all worked.

"We did all the specification work and materials and design for the specialist contractors. We had lots of specialist laboratory experience which was invaluable in what was a very complex building, requiring co-ordination of many specialists."

Above and opposite page: The interior use of concrete, glass, wood and metal creates a contemporary industrial feel, while the use of bricks on the Pears Building's exterior ensures it is visually in keeping with surrounding properties. **Right:** Photovoltaic cells on the roof feed electricity into the building.

5. BUILDING CHALLENGES

The original design was drawn up before the tragic events at Grenfell Tower in 2017, so BMJ had to make many changes to the initial plans.

Matt Adams, Willmott Dixon's senior operations manager for the Pears Building, explains: "We had to adapt our design to ensure we were not just compliant with the regulations but that we over-complied to align with our own very stringent internal procedures.

"One action we took was to change the façade at no charge, to give everyone reassurance the building met the very highest safety requirements in the post-Grenfell era. Furthermore, we introduced fire boarding to the steel frame on the roof in lieu of intumescent paint to ensure the completed building met the highest new standards in terms of fire regulations – even though under the terms of the main contract this was not necessary."

The mix of three distinct uses for the building (laboratory/offices; car parking; and patient accommodation) created significant challenges as did the two-storey difference in levels between the north and south ends of the site.

However the biggest challenge was the external façade sequencing. The precast concrete banding which occurred at floor levels to the main elevations was securely fixed to the slab edges with stainless steel bracketry. These formed the sills and lintels to the full-height windows, and supported the brickwork panels on either side. Projecting and flush metal louvres also added to the complexity of the interfaces.

Top-down services from the two-storey screened external plant deck also required intricate planning.

Water table build-up

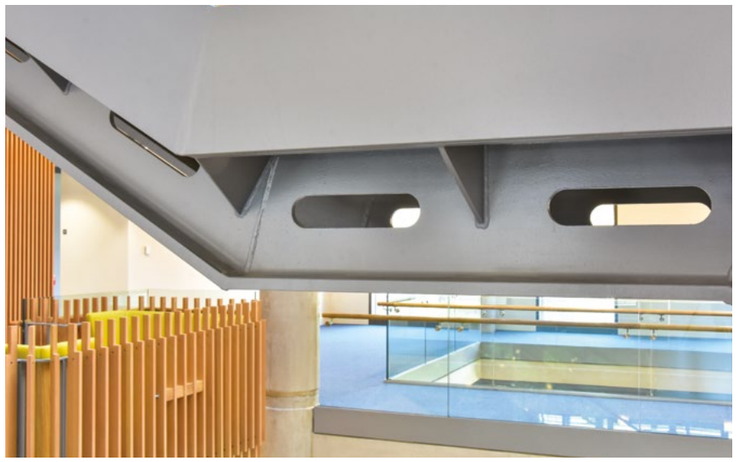
An underground water course discovered near the sub-structure of the building posed another serious challenge. Willmott Dixon dug trial holes and placed monitors in the ground to get readings of the ground conditions and water table. The findings revealed that the water table and build-up was quite substantial to the east elevation of the building.

This presented a risk to the building's stability. The structural engineers changed their model to include a robust contiguous piling wall solution and Willmott Dixon employed a specialist engineer to develop an innovative groundwater collection system.

The system was installed below ground and between the contiguous piles. It was designed to fill with water via a series of perforated pipes and then discharge into the building drainage system. This served to remove excess water or replace it, depending on the changing ground conditions.

"WE HAD TO ADAPT OUR DESIGN TO ENSURE WE WERE NOT JUST COMPLIANT WITH THE REGULATIONS BUT THAT WE OVER-COMPLIED TO ALIGN WITH OUR OWN VERY STRINGENT INTERNAL PROCEDURES."

MATT ADAMS, WILLMOTT DIXON'S SENIOR OPERATIONS MANAGER FOR THE PEARS BUILDING



6. THE COVID CHALLENGE

Senior operations manager Matt Adams had many serious technical challenges to overcome on this scheme. However, the biggest was managing the construction phase through the Covid-19 pandemic.

"I'd overcome technical problems many times in my career but had never worked through a pandemic," he says.

Covid-19 arrived in March 2020 and had a huge impact on programme management. Willmott Dixon decided to keep all sites running within government guidelines. At the Pears Building, operative numbers fell from 170 to 60 in the week following the announcement of the first lockdown on 23 March 2020.

"It was clear that to keep the project running I had to adapt our procedures very quickly," says Matt.

The Construction Leadership Council, a pan-industry body, issued guidelines to help sites keep their operations running and Willmott Dixon swiftly adapted these guidelines to the Pears Building project.

Meetings were set up with supply chain partners to reassure them the operating environment was safe for their employees.

The site had already been designated as tightly restricted – bringing its own challenges under normal operating circumstances – but Covid-19 restrictions added a new dimension.

During the peak phases of 2020, Matt had been expecting to operate with 250-plus people on site each day, but during Covid-19 he was only able to accommodate a maximum number of 170. This maintained social distancing and ensured the company's welfare systems functioned well.

Collaboration and support

Strong working relationships with the three stakeholders – the RFC, the hospital trust and UCL – and their numerous consultants were maintained by the Willmott Dixon team throughout the project. This is a tribute to all involved, as inevitably stakeholders had different aspirations and expectations at various stages.

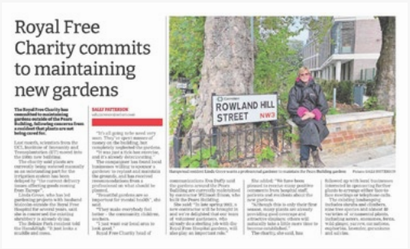
"There were big teams of consultants on the project," says Matt. "I welcomed this as a helping hand to mastering the complexities of the programme and I developed a strong relationship with the various consultants and used their expertise well."

Alpa Patel, the RFC's Pears Building programme director, worked very closely with Matt and was particularly impressed by how his team threw themselves into the spirit of the project.

She says: "Matt was determined everyone would make an emotional connection between their highly practical work and the intellectual solutions that the cement, bricks and glass would facilitate. He commissioned a compelling film where people working on the site shared the experiences of members of their family who had suffered life-threatening conditions and what it meant to help support the fight against these diseases by building the Pears Building."

Community involvement

The site is located near Hampstead Green, an ancient natural meadow. The Willmott Dixon team worked with Friends of Hampstead Green – a local group of volunteers – providing wild flower seeds and helping the group to plant them within the green.


Royal Free Charity commits to maintaining new gardens

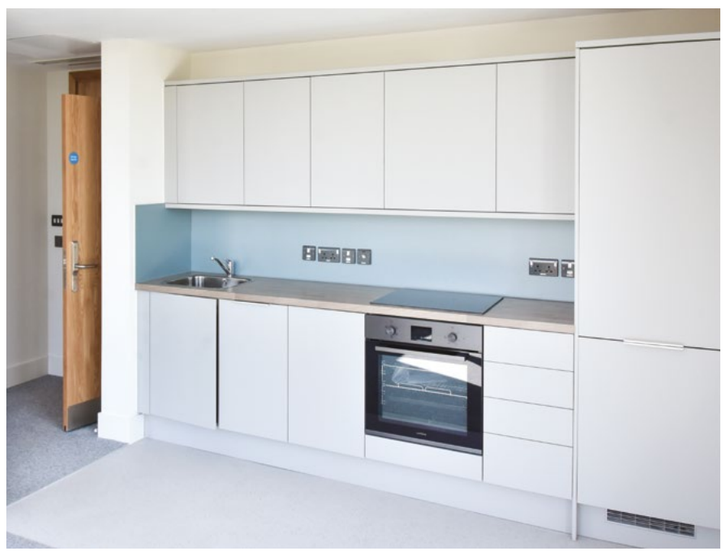
ROWLAND HILL STREET NW3

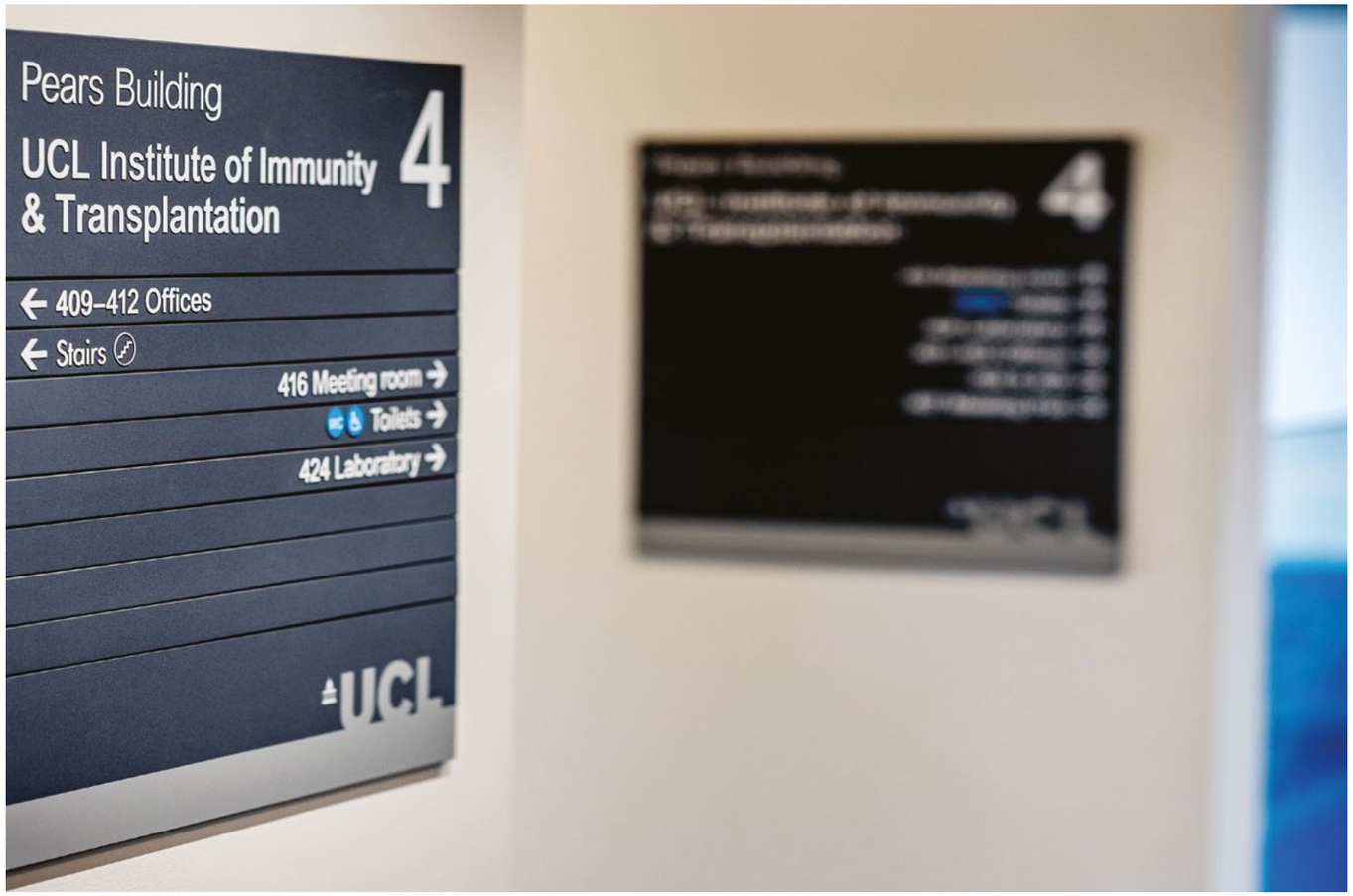
Left: A feature staircase spans the width of the atrium with cantilevered breakout spaces to foster interaction between the building's users. Below left: The Willmott Dixon team responsible for delivering the Pears Building. Below right: The building contains two floors of comfortable patient accommodation.

Above: Alpa Patel, Pears Building programme director, Royal Free Charity, and Willmott Dixon's senior operations manager, Matt Adams, collect the Best Project Above £50m Award at the Construction News Awards.

"MATT WAS DETERMINED EVERYONE WOULD MAKE AN EMOTIONAL CONNECTION BETWEEN THEIR HIGHLY PRACTICAL WORK AND THE INTELLECTUAL SOLUTIONS THAT THE CEMENT, BRICKS AND GLASS WOULD FACILITATE."

ALPA PATEL, PEARS BUILDING PROGRAMME DIRECTOR, ROYAL FREE CHARITY





"THE PEARS BUILDING RAISES THE PROFILE OF THE IIT'S RESEARCH, WHICH HELPS ATTRACT A HIGH CALIBRE OF CLINICAL EXCELLENCE, AND THAT WILL DRIVE NEW TECHNOLOGY AND NEW TREATMENTS"

PROFESSOR EMMA MORRIS, DIRECTOR OF THE UCL DIVISION OF INFECTION AND IMMUNITY

Fighting cancer

Cancer is a major health problem worldwide with WHO projections predicting an increase in incidence by 57% from 14 million cases in 2012 to 22 million cases by 2032. The IIT scientists are exploring the role of the immune system in tumour development, and whether novel forms of immunotherapy can be used to treat cancer.

From left: The Pears Building combines world-class research laboratories with offices for the Royal Free Charity and space for patient clinical trials.

7. A WORLD LEADER IN HUMAN IMMUNOLOGY

The Pears Building opened in October 2021 and won instant plaudits from its occupants.

Professor Stauss, director of the IIT and the man whose vision it was back in 2008, is delighted at how his "baby" has turned out.

"The IIT brings together scientists, clinicians, nurses and patients to gain novel insights into the underlying causes of disease. It combines the clinical excellence of the Royal Free London's hospitals and the research excellence of scientists at UCL in the most modern facilities in the new Pears Building.

"My own research has focused on the study of the immune system in cancer patients. In the past 10 years cancer immunology has made tremendous progress and the development of immunotherapy has revolutionised the treatment of certain types of cancer. We can now learn from this progress in cancer therapy and develop new immunity-based treatments for chronic infection, autoimmunity and for patients after transplantation. IIT research will provide our patients with cutting-edge therapies that may not be available elsewhere."

He adds: "I am very grateful to all the donors who have supported the IIT and the construction of the Pears Building. We have received generous donations from the Pears Foundation, the Wolfson Foundation, the N. Sethia Foundation, Fidelity Foundation and the Catherine Cookson Charitable Trust."

Clinical excellence

His colleague, Professor Emma Morris – who became the director of the UCL Division of Infection and Immunity during the project – is equally thrilled. She says: "It's wonderful to have such a nice working environment, and all this swanky new kit."

Professor Morris adds: "There are two main benefits with the Pears Building. It raises the profile of the IIT's research, which helps attract a high calibre of clinical excellence, and that will drive new technology and new treatments and translational patient-focused research.

"And secondly, the proximity and linkage between the two institutions means that cells or blood don't have to travel far, and it's much easier for clinicians and researchers to share ideas and discuss patient treatments."

Dr John Connolly, chief executive of the Royal Free Hospital, who arrived with less than a year of the project to go, describes the Pears Building as "the perfect gift!".

Apart from all the other benefits it brings, Dr Connolly, a kidney specialist, is looking forward to treating some of his own patients with medical advances developed at the Pears Building. "One of the great things about it is its adjacency to us. Our clinicians, who are experts in dealing with patients, can now work right beside people who understand the science. And it makes it easier for the patients – who are often the real experts – to talk to the scientists too.

"Because of this closeness, patients can be offered new trial drugs and innovative treatments much more quickly, as the scientists working in the Pears Building are right in at the start of the discovery process." He adds: "The sharing of ideas is absolutely critical."

Tackling Covid

One of the many areas of human immunity being explored by the IIT's scientists is Covid-19. Dr Connolly says: "We have scientists who are experts in understanding viruses, and we've been participating in national projects to understand Covid.

"It is one of our big specialisms and we hope to be at the forefront, not just of developing new treatments, but accelerating them so as to benefit patients in a much shorter timescale."

The final word goes to RFC chief executive Jon Spiers, whose fundraising efforts helped pay for this new world-leading centre of medical excellence. "It's a stunning building and very striking architecturally. Everyone's been impressed by how well we've all worked together."

"WE HOPE TO BE AT THE FOREFRONT, NOT JUST OF DEVELOPING NEW [COVID-19] TREATMENTS, BUT ACCELERATING THEM SO AS TO BENEFIT PATIENTS IN A MUCH SHORTER TIMESCALE."

DR JOHN CONNOLLY, CHIEF EXECUTIVE, ROYAL FREE HOSPITAL

He stresses the community dimension of the Pears Building, pointing out that: "Research facilities are often on science parks and are detached from the local community. Here, we've placed great stress on our place in the community, including opening up the building to the public and having a café that can be used by anyone. It's created a lovely feel of bringing the community and the hospital and research teams all together in one building.

"We now have a real powerhouse for research, and one which will only accelerate all the wonderful work our doctors and scientists undertake."

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BRILLIANT BUILDINGS

Willmott Dixon is a privately-owned contracting and interior fit-out group. Founded in 1852, we are family-run and dedicated to leaving a positive legacy in our communities and environment. Being a large company means we can create a huge and lasting positive impact on our society. This is not only done through what we build and maintain; it's achieved through the fantastic efforts of our people who make a major contribution to enhancing their local communities.

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