HOARE LEA

From research to reality. Pioneering work made possible. Challenge accepted.

HOARE LEA & IMPERIAL COLLEGE LONDON

JOHN / 04.09.15 / SENT 16:22

Turning an office building into a lab facility. Doable?

Tackling the global challenges facing society today often requires new ways of thinking. Just as important, though, is the ability to develop new ways of *doing*.

When academics from different disciplines, institutions, and industries come together, ideas can move from research into reality at a faster pace than ever before.

These principles of collaboration inspired Imperial College London to develop a new Molecular Sciences Research Hub – where up to 800 researchers could work side-by-side to make scientific leaps in energy, healthcare, and sustainability. With nine floors of high-specification laboratories making it one of Europe's densest facilities, the engineering required to make this possible was one of our most memorable challenges...

CHRIS / 04.09.15 / SENT 16:34

Tricky, but we can make it happen... Let's get thinking.

“It’s more than just bricks and mortar; the ethos that this building is going to create is what’s most exciting.”

DR LAURA BARTER
SENIOR LECTURER, DEPARTMENT OF CHEMISTRY,
IMPERIAL COLLEGE LONDON

CLIENT: IMPERIAL COLLEGE LONDON
ARCHITECT: SHEPPARD ROBSON
SHELL & CORE CONTRACTOR: LAING O’ROURKE
FITOUT CONTRACTOR: ISG
COST: £120M

Our approach.
Meet Chris Myers, Project Partner for the Molecular Sciences Research Hub.

"The journey we took with Imperial College London was a true example of like-minded individuals collaborating to turn complex requirements into reality. Together with the wider design team, we knew we'd be helping the university shape the future of chemistry around the world."

FUTURE FOCUSED

Since 1845, Imperial College London's Department of Chemistry has had a prestigious reputation. With an impressive worldwide ranking to maintain, the department needed a world-class facility that would propel its work into the 21st century. The new Molecular Sciences Research Hub would be part of the university's White City North Campus masterplan, helping to bring together leading researchers, businesses, and partners to turn scientific discoveries into commercial products and services.

UP FOR THE CHALLENGE

The development chosen to house the hub started its life as a general workplace building. Transforming it into a highly flexible space filled with specialist laboratories that would meet the needs of world-class biologists, physicists, engineers, and chemists would require tremendous expertise, collaboration, and a can-do attitude. We fit the bill. Time was tight, with a strict deadline dictated by the university's academic calendar, but we set about coordinating a strategy that would demonstrate how best to approach the challenge.

ENGAGED SPECIALISMS

- ACOUSTICS
- FIRE ENGINEERING
- ICT
- MEP
- SUSTAINABILITY

REALISING A ROBUST STRATEGY

INNOVATIVE THINKING

A COMPLEX PUZZLE: SOLVING THE PROBLEM

Turning a building designed to be an office into a science facility is like trying to complete a puzzle using the wrong pieces. Problem one, from day one, was how to work with the constraints of the existing building – its plant space, risers, and critical slab-to-slab heights – to squeeze the extensive services required into an environment that was not designed to hold them. The biggest consideration for chemistry buildings is the amount of air needed for fume hoods, which capture and remove air-borne hazardous substances generated during laboratory experiments. With the fume hoods constantly extracting air in order to do this, fresh air needs to come into the building at the same rate to stop the building imploding. This air also needs to be warmed or cooled (depending on external conditions) to ensure the comfort of those using the building, and requires large ducts and units to do so. Fitting these into a building, already built and ready to be used as an office was a herculean task. Thanks to a great relationship we had built with Imperial College London over the years, we were trusted to solve the problem...

PIVOTAL MOMENT: STARTING STRATEGY

We set about researching methods for providing diversified air loads to large chemistry facilities using empirical data provided by Oxford, Bristol, and Reading universities. Along with some engineering flair, cutting-edge visualisations, and a can-do spirit, we got to an answer very quickly. By installing new risers, new plant spaces, and some clever integrated design in the labs themselves, we could fit in 330 fume hoods. It would make the building one of the most demanding in all of Europe. Critically, this solution relied on installing a variable air volume system, which would ensure only the air needed to run a certain number of hoods would be used, moving it around to suit demand. The added advantage? This solution would also be much more energy efficient. We proved its viability to Imperial College London with engineering visualisations and demonstrated we were the people to make it possible. Our solution also enabled the creation of large open-plan laboratory spaces. This meant research teams could shrink and grow according to their projects – creating a more dynamic and productive way of working.

VARIETY OF NEEDS: SIMPLE EXPLANATIONS

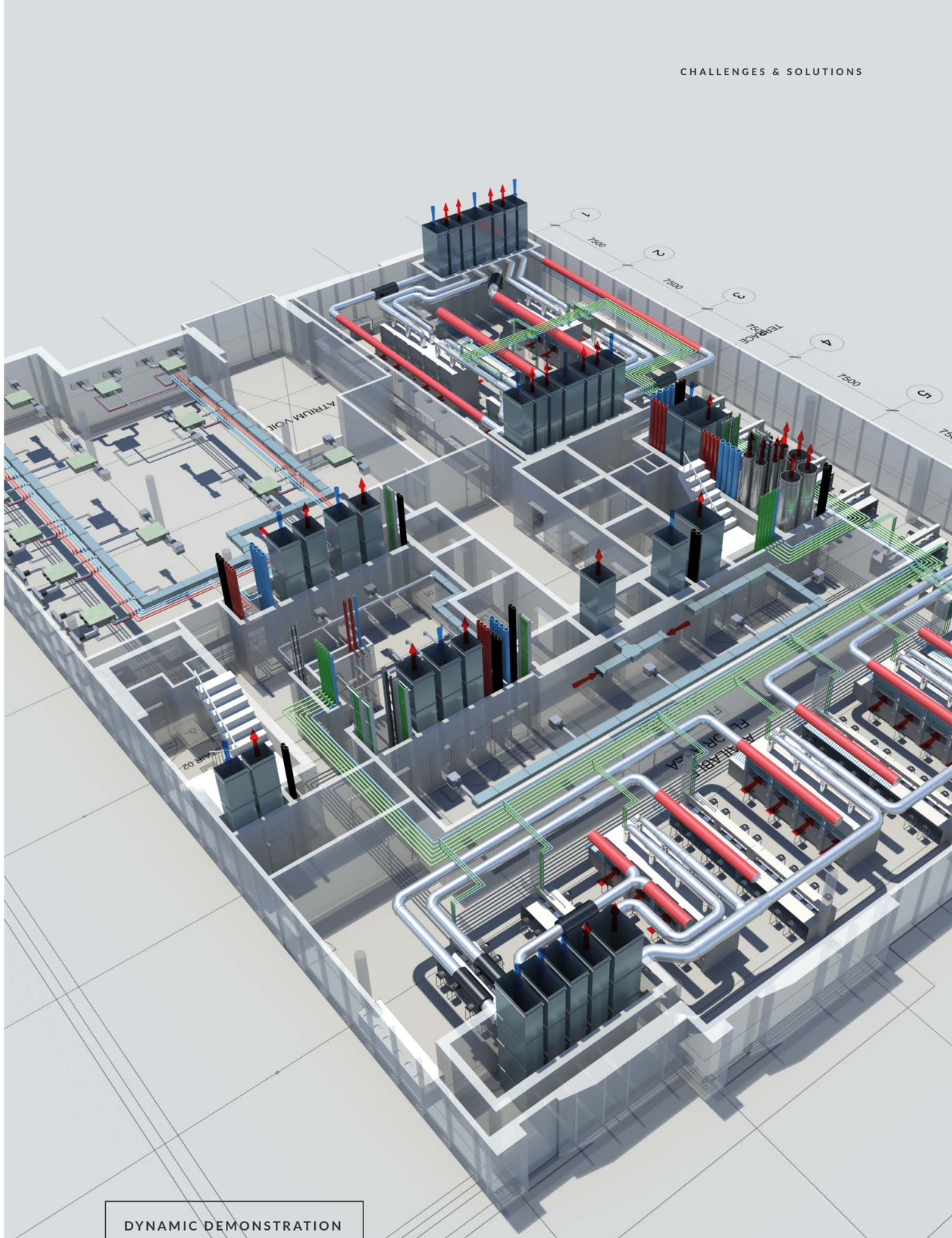
Once we got into the more detailed aspects of design, we began talking with users and other stakeholders, ensuring the scientists using the fume hoods would understand the wider system. We even went as far as having a mock-up lab built offsite, where scientists could interact with different fume hood samples and other kit to understand what would work best.

There was a delicate balance of demands from each room type that we also needed to address. The specialist laboratory spaces needed high levels of temperature control; the high-specification lecture theatre required advanced IT cabling; and the Nuclear Magnetic Resonance suite demanded slow air speeds. Together, they added to the complexity of this already exceptional project.

3D modelling
to coordinate the tight layout.

800
researchers.

2018
opening.

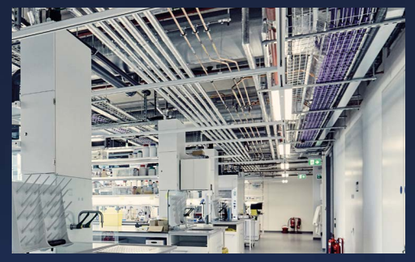


DYNAMIC DEMONSTRATION

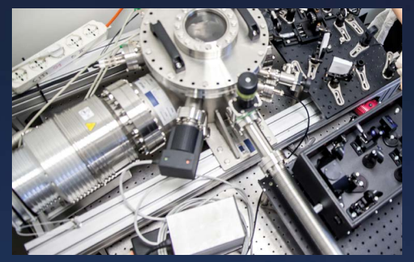
250-seat lecture theatre
where live chemical experiments can be projected

330+ fume cupboards

9 storeys



100m³ of fresh air
required to service the laboratory areas



2 laser
laboratory areas

1 advanced
Nuclear Magnetic Resonance suite

25,000m³
of space

Project impact. Reaching further.

When the Molecular Sciences Research Hub opened in 2018 it formed a flagship building within Imperial College London's White City campus. With a wider ambition for the area to become a leading destination for bio-tech, digital and creative industries, the building plays a key part in this North London community and growing local economy.

SUSTAINABLE SOLUTIONS

It was vital that we worked hard not only to deliver this exceptional building, but – at the same time – keep energy-use as low as possible. Imperial College London's understanding of the advantages of low-carbon solutions is comprehensive. As the occupier of the building for decades to come, the university can see the value of both long-term payback and impact on the environment. With a commitment to passive design, the "be lean, be clean, be green" approach, and by working as BREEAM assessors, we helped this highly specialist building operate as sustainably as possible. The dedicated local cooling provision controls areas of high heat gain; the LED lighting (a first for Imperial College London's labs and fume cupboards) reduces energy use; the choice of building façade moderates solar gain in labs where temperature control is vital; and most significantly, the energy centre for the building serves five others on the campus.

The BREEAM Excellent rating the building achieved was just the start though; our trusted ongoing relationship with the Estates Team – which means they can pick up the phone for advice at any time – allows us to continually to help them operate the building in the best way possible.

WORLD-CLASS ENERGY SAVINGS

THE RIGHT CHEMISTRY

For the researchers now working within the building, its flexibility is everything. By future-proofing the MEP services so they could be easily modified, we opened up a new way of working for the building's 800 researchers, who can collaborate under one roof in ways they've never been able to before. Professor Oscar Ces, Director of the Institute of Chemical Biology, notes: "When you move into a space, traditionally you stay there, and the person in the lab beside you ends up being next to you for 10 years or more. The way the hub has been designed is almost like open-source – it's pop-up science for real. We'll identify a challenge and a group will tackle it for two or three years. Then, once it's solved, that group will dissolve, and the infrastructure will change according to the next challenge. It gives us flexibility that we've never had before."

This approach is already proving its worth, with teams at the Molecular Sciences Research Hub progressing in many core research areas. Together, they are addressing some of society's greatest challenges: from understanding diseases and developing clean sources of energy, to meeting the food and water needs of our growing world population.

The average user would never know the building was originally designed as an office.

“By bringing together a vibrant community of chemists as well as experts in the fields of medicine, engineering and other molecular sciences, we’ve created a new networked research environment that encourages collaboration and innovation.”

PROFESSOR ALAN ARMSTRONG
HEAD OF THE DEPARTMENT OF CHEMISTRY

Achievements recognised.

– **BREEAM Excellent.**

– **2019 S-Lab Award for Excellence in Laboratory Design, Management and Operation: Refurbished Category.**

COMPLETED WITH PRIDE

HOARE LEA

Engineers of human experiences.

Hoare Lea is an award-winning engineering consultancy with a creative team of engineers, designers, and technical specialists. We provide innovative solutions to complex engineering and design challenges for buildings.

Irrespective of the scale or complexity of a project, we provide a full range of MEP, environmental, and sustainability services, bringing buildings to life and ensuring that they perform in operation as well as they look.

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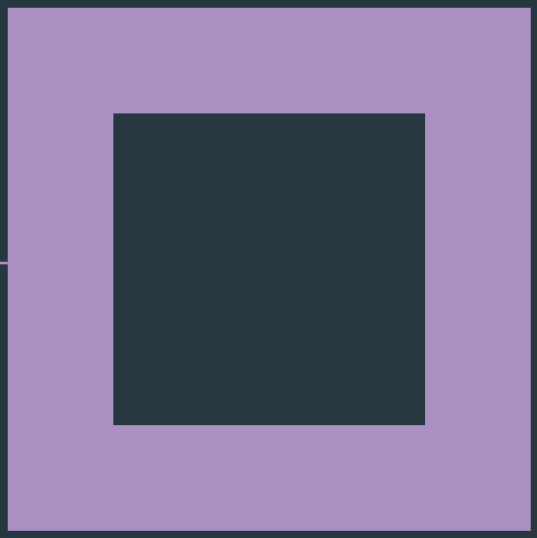

Designed and produced
by Hoare Lea