CF MØLLER ARCHITECTS

THE LAB FOR THE FUTURE

FLEXIBLE AND INNOVATIVE RESEARCH-CENTRES
THAT BOOST GROUND-BREAKING SCIENCE

Cover: Maersk Tower, photo by Adam Mørk

One would expect that the most important part of the research environment is being in the laboratories, in front of the flask or in front of the computer. The fact is that you get your best ideas when having a cup of coffee out on the research plaza, or when you run into a colleague from one of the other levels.

PROFESSOR OF TISSUE MORPHOLOGY AND DIFFERENTIATION, DSC,
OLE WILLIAM PETERSEN

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MAERSK TOWER

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INTRODUCTION: GROUND BREAKING WORK OVER A CUP OF COFFEE

World-class research that changes the world and improves life for people and planet demands world-class facilities. Innovative design enables new ways of releasing creative potential, embodied in an architecture that fosters closer connections and creativity between colleagues, scientists and society at large.

We aim to create projects where science buildings become mixing chambers, capable of creating a social and interdisciplinary environment, where great minds potentially exchange just as many ideas over a cup of coffee as across the test tubes in a lab.

Where the overall planning defines a new way of bringing its scientists together in a stimulating, transparent architecture, where building and context turn the specific site into a buzzing campus that is capable of showcasing and expressing the particular vision of science, fosters innovation, attracts talent and makes its inhabitants proud.

CREATING SOLUTIONS FOR A RAPIDLY ADVANCING SOCIETY, TODAY AND TOMORROW

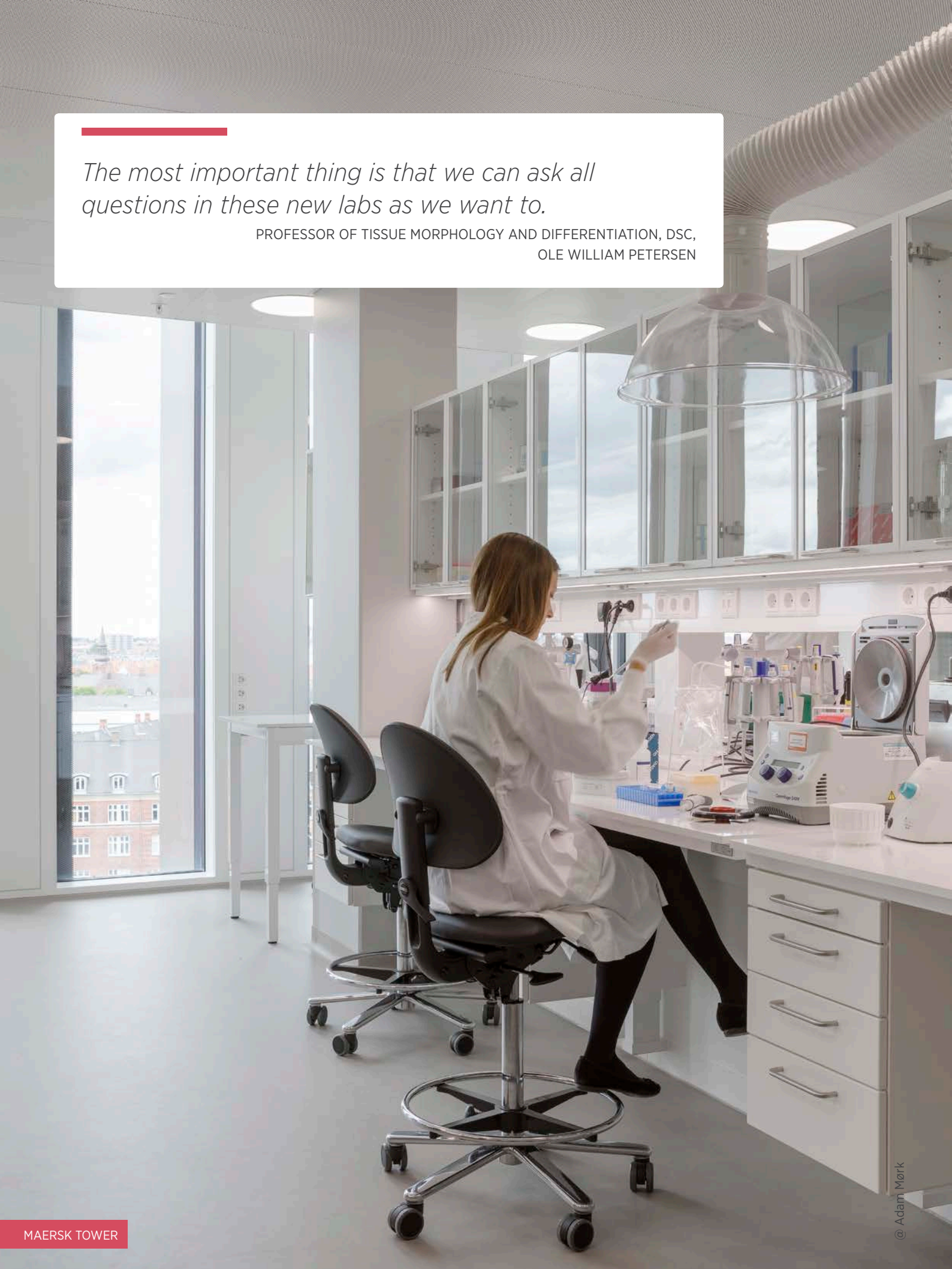
The research facility of the future balances the demand for complex interdisciplinary setups integrated with its surroundings, where the overall objective is to create an architectural solution that communicates with the public, focuses on sustainability and appears as a landmark for both the work in the building and its surroundings. This can be obtained by architectural solutions based on a holistic and content-driven design approach, where we script the functionality of a building by involving the users of the building, experience, evidence and artistic craftmanship.

The core of this design approach is based on putting people and wellbeing at the centre. This has been the backbone of C.F. Møller Architects' work from the very beginning in 1924 and our contribution to building up Scandinavian welfare societies with Aarhus University as the first major project which still ranks high as one of the best universities in the world.

Please enjoy this booklet and experience how we create world-class lab and research power centres. Every project is realised in close collaboration with its users and we love working with people constantly striving to create solutions for a rapidly advancing society, today and tomorrow.

The most important thing is that we can ask all questions in these new labs as we want to.

PROFESSOR OF TISSUE MORPHOLOGY AND DIFFERENTIATION, DSC,
OLE WILLIAM PETERSEN



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WORLD-CLASS LABS

World-class research facilities require both state-of-the-art technical equipment and inspiring and enjoyable surroundings to create the perfect workplace for groundbreaking research and to attract the best researchers in the world.

C.F. Møller Architects have experience from designing a variety of labs and research complexes that set new standards and that are very well received by the users. This is because we have the knowledge, experience and understanding of what is important to accomplish very complex technical ambitions from working with this in the fields of healthcare, education and culture.

The Maersk Tower is a state-of-the-art research building whose innovative architecture creates the optimum framework for world-class health research, making it a landmark in Copenhagen. It aims to contribute positively by linking the University of Copenhagen with the surrounding neighbourhoods and wider city.

CLEAN AND STEADY

It is utterly important that vibrations from the outside world do not influence on what goes on in the labs. Another critical aspect is that labs have to be easy to keep clean and not allow the research to be contaminated by dirt of any kind. This can be obtained in clever ways and C.F. Møller Architects have been setting new standards for how to make rock steady and very clean and safe labs.

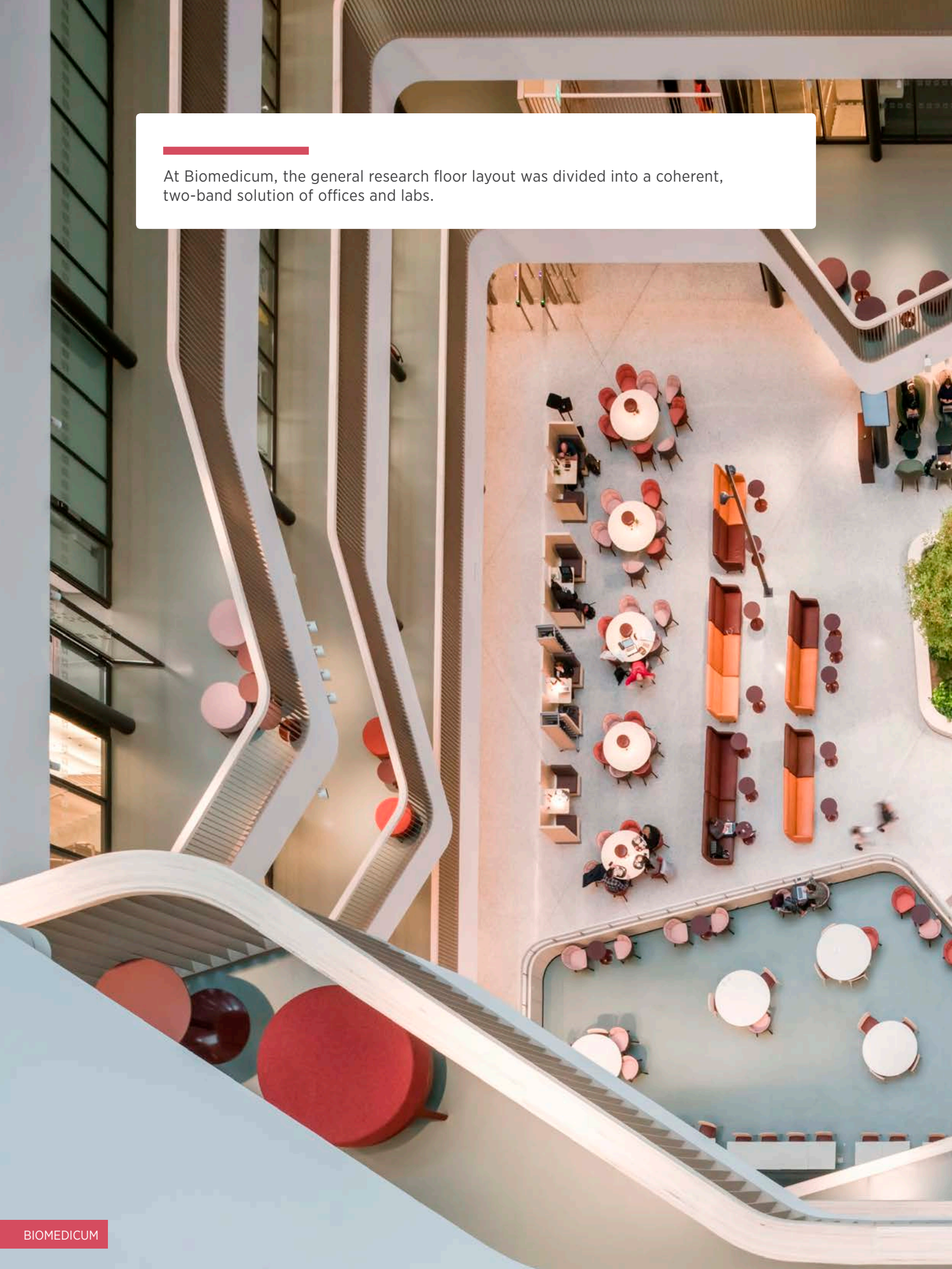
At the Maersk Tower we designed an innovative new heating system integrated into the window panels. This contributes along with other clever solutions to make cleaning swift and efficient and it eliminates the danger of spilling liquids into radiators.

To keep the labs in the tower absolutely free of vibrations, the entire building is realised through an extra-reinforced, in-situ concrete structure, from base up. This makes the entire building rock steady on all floors, ensuring sensitive setup in the labs will not be disturbed by the heavy inner-city traffic flanking both sides of the tower.

At Biomedicum, a new powerhouse for research at the Karolinska Institute in Stockholm, vibration-free floors were created in a cost-effective way, by designating labs to vibration-free zones in clear, defined bands.

We divided the general research floor layout into a two-band solution, where office spaces are all placed in an outer perimeter band that is 10m wide, followed by a 20m wide lab zone running the full length around the entire inner courtyard of the complex.

A cross-sectional solution perceived as a spatial entity, but statically divided into two.



At Biomedicum, the general research floor layout was divided into a coherent, two-band solution of offices and labs.


© Mark Hadden

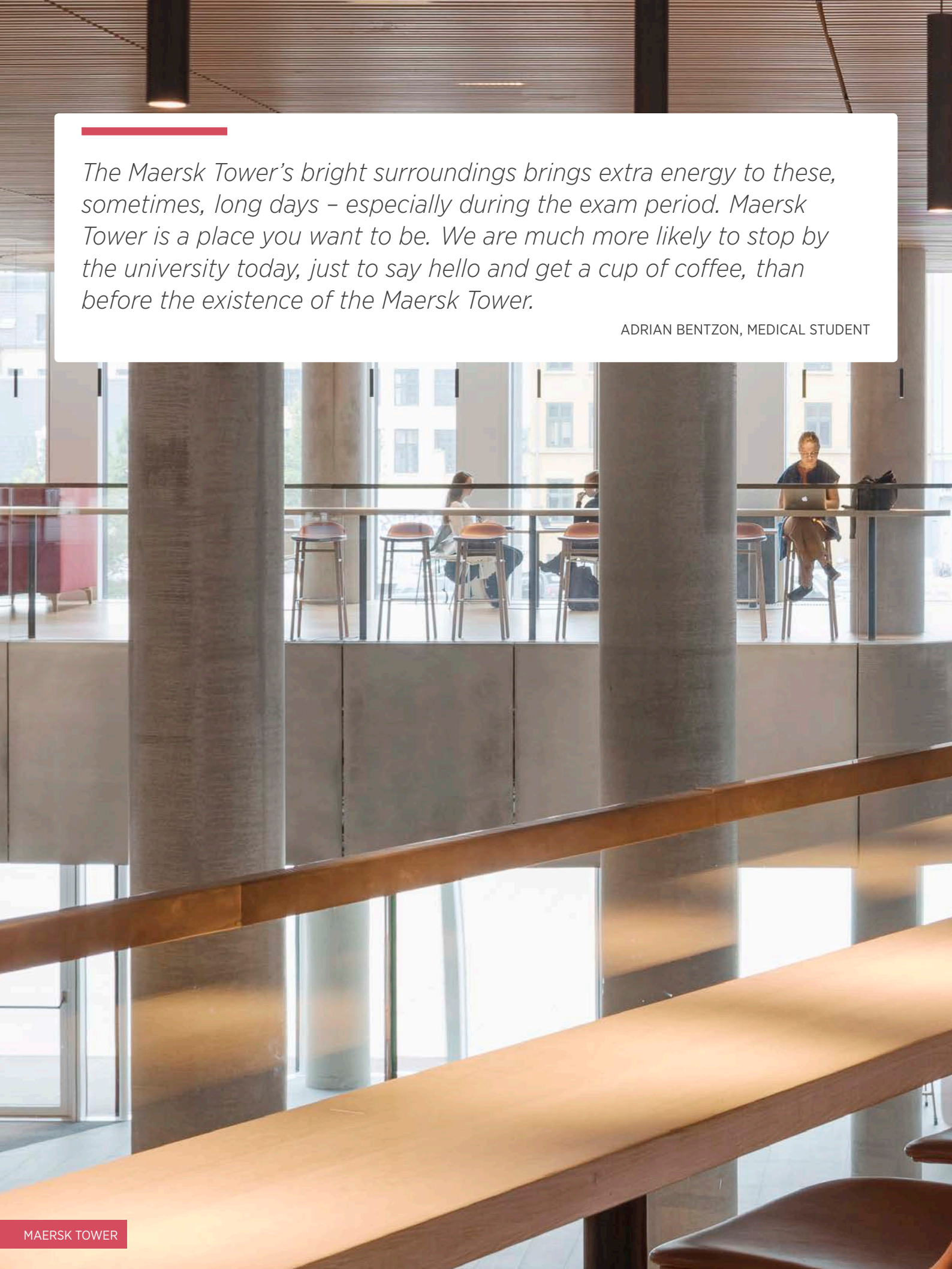

eppendorf
Centrifuge 5417R

© Adam Mørk

SAFETY ON BOARD

Building a state-of-the-art research facility demands collaboration. At C.F. Møller Architects we collaborate with some of the world's best engineering companies and consultants to make the wishes from our clients and demands from our visionary architecture come true. This approach ensures both a high architectural and technical standard in each project.

Working in the lab is a cornerstone in research and sometimes this represents a danger that the architectural and technical solutions have to eliminate. This is done by establishing effective boundaries between labs and public areas, designing labs with excellent layouts for moving freely around in them, and incorporating safe chambers and fire-proof elements in the labs.



The Maersk Tower's bright surroundings brings extra energy to these, sometimes, long days – especially during the exam period. Maersk Tower is a place you want to be. We are much more likely to stop by the university today, just to say hello and get a cup of coffee, than before the existence of the Maersk Tower.

ADRIAN BENTZON, MEDICAL STUDENT

© Adam Mørk

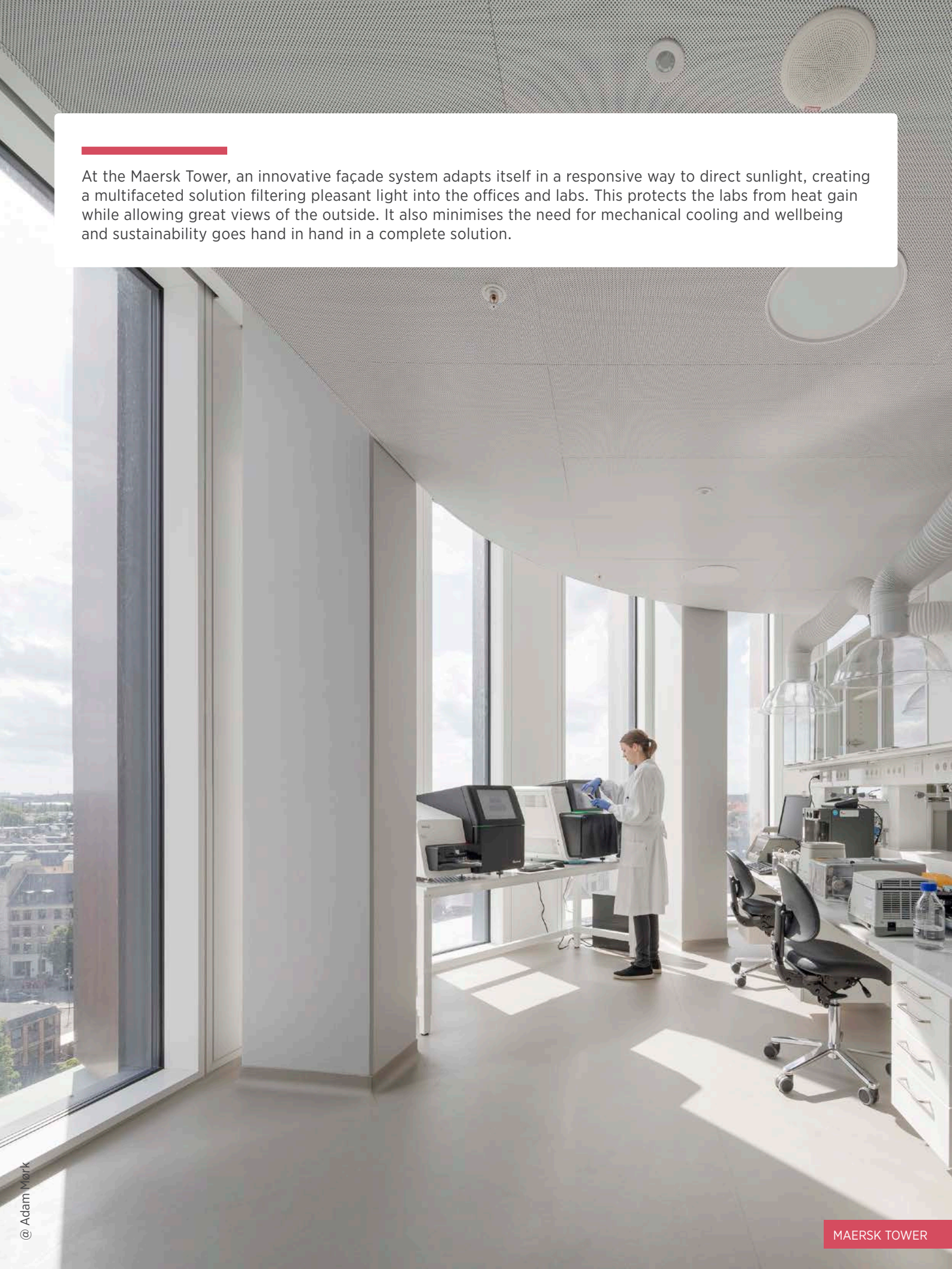
SUPPORTING WELLBEING AT WORK

C.F. Møller Architects have a strong focus on creating an architecture that stimulates wellbeing, knowing it has a positive effect on people's possibility to perform, stay healthy and simply enjoy being at work. This is particularly vital for researchers, who spend many hours at work indoors and therefore need to thrive well in a balanced distribution of light, both natural and artificial.

Another evidence-based approach to creating wellbeing is the conscious use of natural materials, especially used in a sensory way throughout the interiors of our projects, creating stimulating spaces. The sustainability of building materials is also of great importance for the total ecological footprint of a building.

More and more building projects demand sustainable materials, and as such we mapped the entire list of our materials used in the Maersk Tower but also based on evidence-based experience that healthier materials create a better work environment and as such happier scientists. These approaches are all based on our many years of experience building numerous Scandinavian welfare state buildings, and today form the core of our vision of making healthy and better research facilities for the future.

At the Maersk Tower, an innovative façade system adapts itself in a responsive way to direct sunlight, creating a multifaceted solution filtering pleasant light into the offices and labs. This protects the labs from heat gain while allowing great views of the outside. It also minimises the need for mechanical cooling and wellbeing and sustainability goes hand in hand in a complete solution.



We've become part of something bigger. The study environment is amazing, with space for exploration, innovation and experimentation. We've always thrown ourselves into new projects, and we keep on experimenting. It's always been like this and this will continue at the "new Tek". The building is perfect for dialogue and dynamics.

LINE AMTORP, VICE CHAIR OF THE JOINT COUNCIL OF
THE UNIVERSITY OF SOUTHERN DENMARK'S ENGINEERING STUDENTS

@ Jørgen True

NEW FACULTY OF ENGINEERING, UNIVERSITY OF SOUTHERN DENMARK

SPACES FOR ALL

One very important catalyst for generating new ideas that will change the world and the way we think is informal encounters between bright and curious people. To ignite the power of sharing we have a strong focus on making inclusive spaces for professors, students, staff and citizens in our buildings, as we know this helps support groundbreaking research.

Both the Maersk Tower in Copenhagen and Biomedicum in Stockholm are recent examples of how we create this. Both buildings contain highly advanced lab and research facilities and they both share the same architectural approach to release the creative potential of researchers and students. This is done by nudging encounters through offering a very flexible, open and transparent building to support new ideas and integrate science with society.

At the Maersk Tower in Copenhagen this is facilitated by designing both vertical and horizontal connections between floors, labs, offices and shared spaces. Most visible is an elegant stairway from top to bottom, making it possible for people to meet across floors. Another benefit from this approach is a significant reduction of square metrage for transportation like hallways.

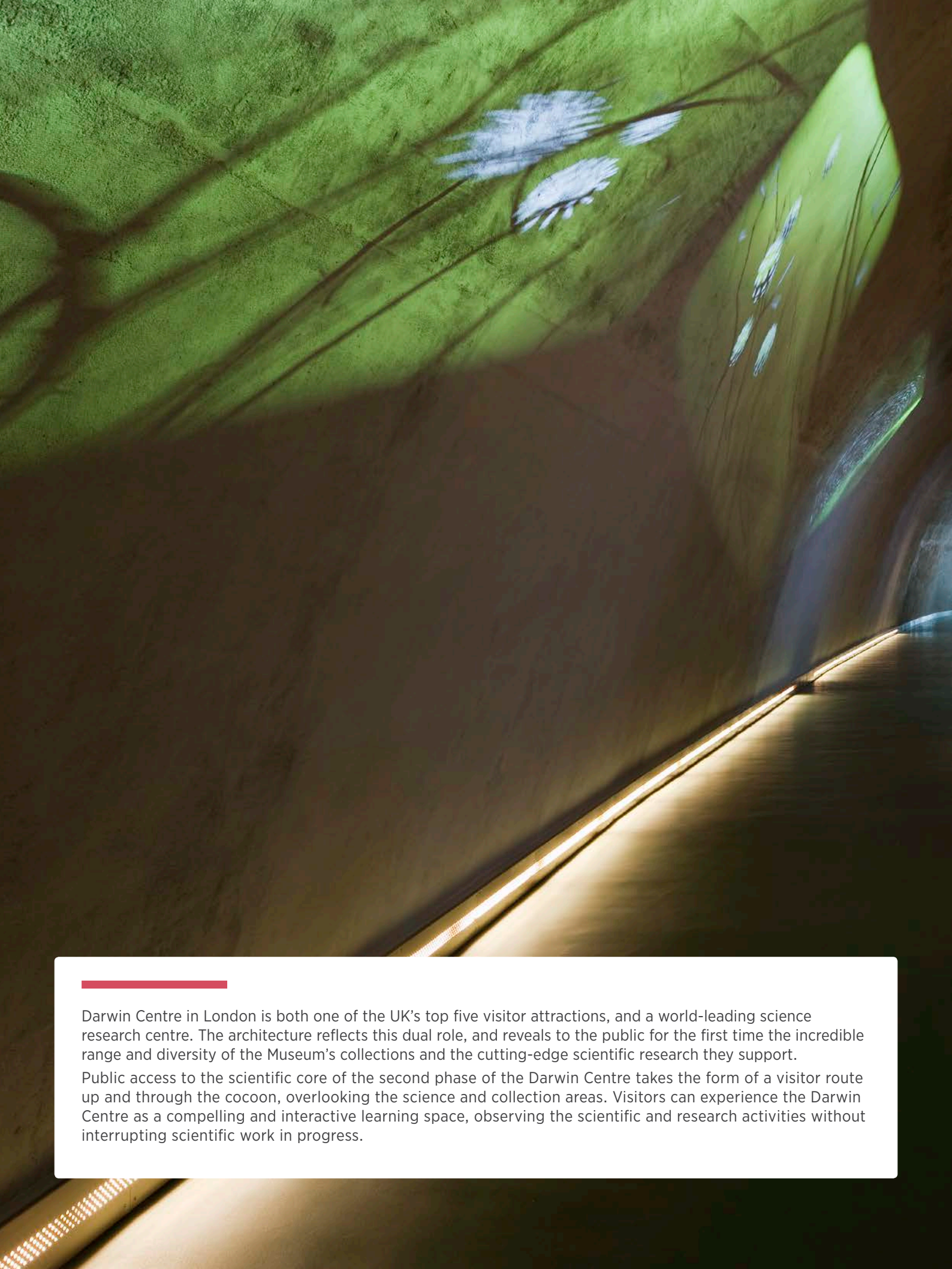
Transparency is another important value for future centres of research, letting the public gain a greater understanding of the field of research and better connecting society and science. This is seen at the Maersk Tower and Biomedicum but also at the Natural History Museum, Darwin Centre in London.

Biomedicum in Stockholm is equipped with shared infrastructure, which means that advanced technology platforms and expensive equipment can be utilised by more people, and that research groups can collaborate to achieve results. By bringing the scientific activities into separate disciplines together under one roof, the research lab provides new opportunities for crossover research. There are also a number of meeting nodes and a core of common facilities that make it possible to utilize more expensive equipment more efficiently. The design has enabled flexible, accessible and functional working environments in a natural meeting place in the form of a large central atrium.

The new construction is not only intended to provide a building in the campus park, but also to accommodate the park within the building. With a glass-covered green atrium, the outdoor campus area is continued through the building, thereby reinforcing the social qualities of the green campus to the benefit of knowledge-sharing and interdisciplinarity.

© Mark Hadden

BIOMEDICUM



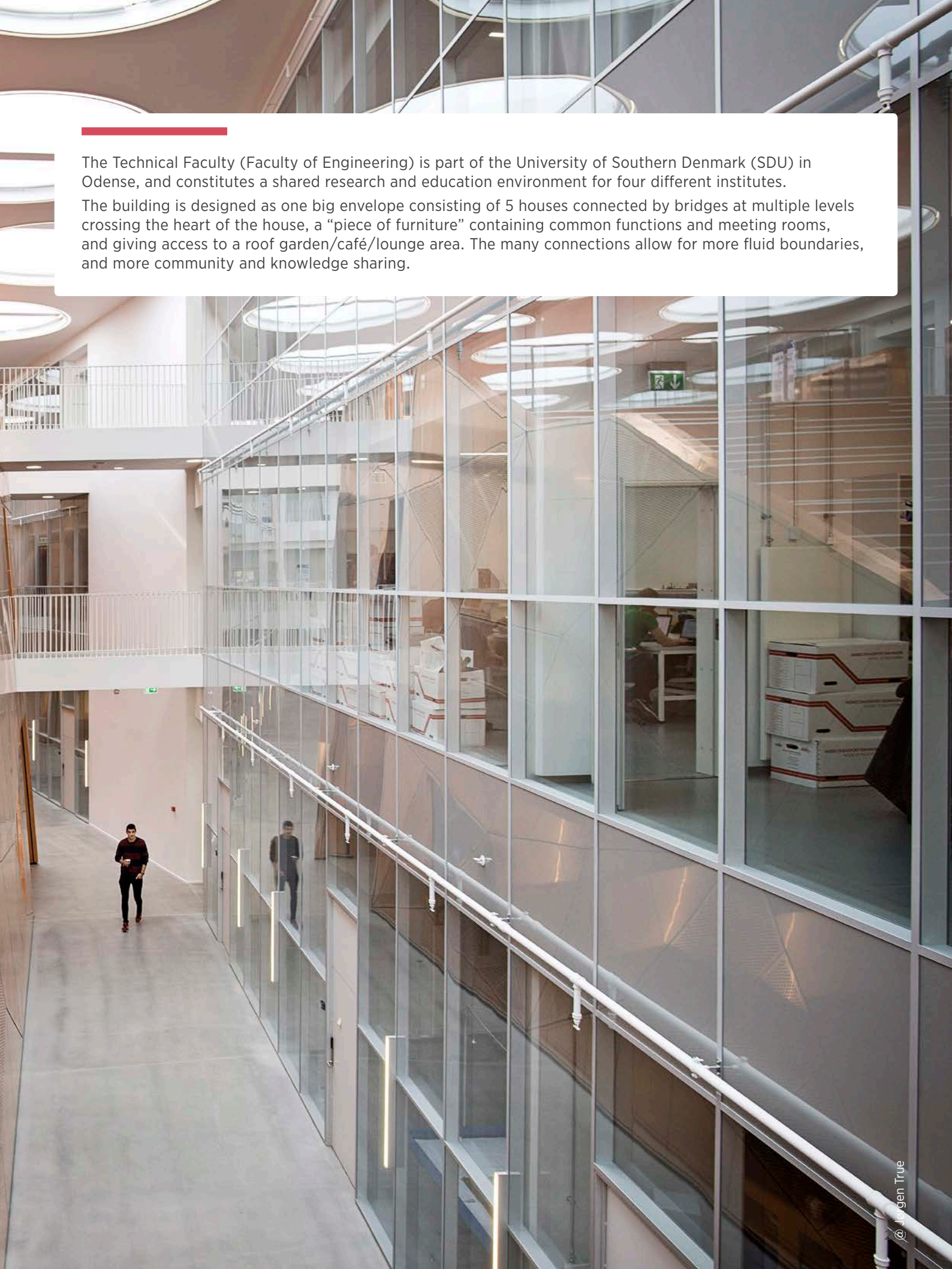
Darwin Centre in London is both one of the UK's top five visitor attractions, and a world-leading science research centre. The architecture reflects this dual role, and reveals to the public for the first time the incredible range and diversity of the Museum's collections and the cutting-edge scientific research they support.

Public access to the scientific core of the second phase of the Darwin Centre takes the form of a visitor route up and through the cocoon, overlooking the science and collection areas. Visitors can experience the Darwin Centre as a compelling and interactive learning space, observing the scientific and research activities without interrupting scientific work in progress.

@ Torben Eskerod

The Technical Faculty (Faculty of Engineering) is part of the University of Southern Denmark (SDU) in Odense, and constitutes a shared research and education environment for four different institutes.

The building is designed as one big envelope consisting of 5 houses connected by bridges at multiple levels crossing the heart of the house, a “piece of furniture” containing common functions and meeting rooms, and giving access to a roof garden/café/lounge area. The many connections allow for more fluid boundaries, and more community and knowledge sharing.



PUTTING USERS AT THE HEART

A key to success when designing a modern and well-functioning research facility is a strong dialogue with the future users of the building. C.F. Møller Architects have a strong tradition in involving the users to ensure buildings fulfil the very specific needs unique to each complex.

Our expertise is to translate these needs and ambitions into innovative architecture that will stand the test of time and deliver on every aspect. We do this based on our experience with complex buildings, evidence-based design and an overall holistic approach.

This makes every building unique and creates a perfect fit for the users and the surrounding society for many years into the future. We have a strong focus on flexibility – knowing the future can be hard to predict, we leave room for adaptation.

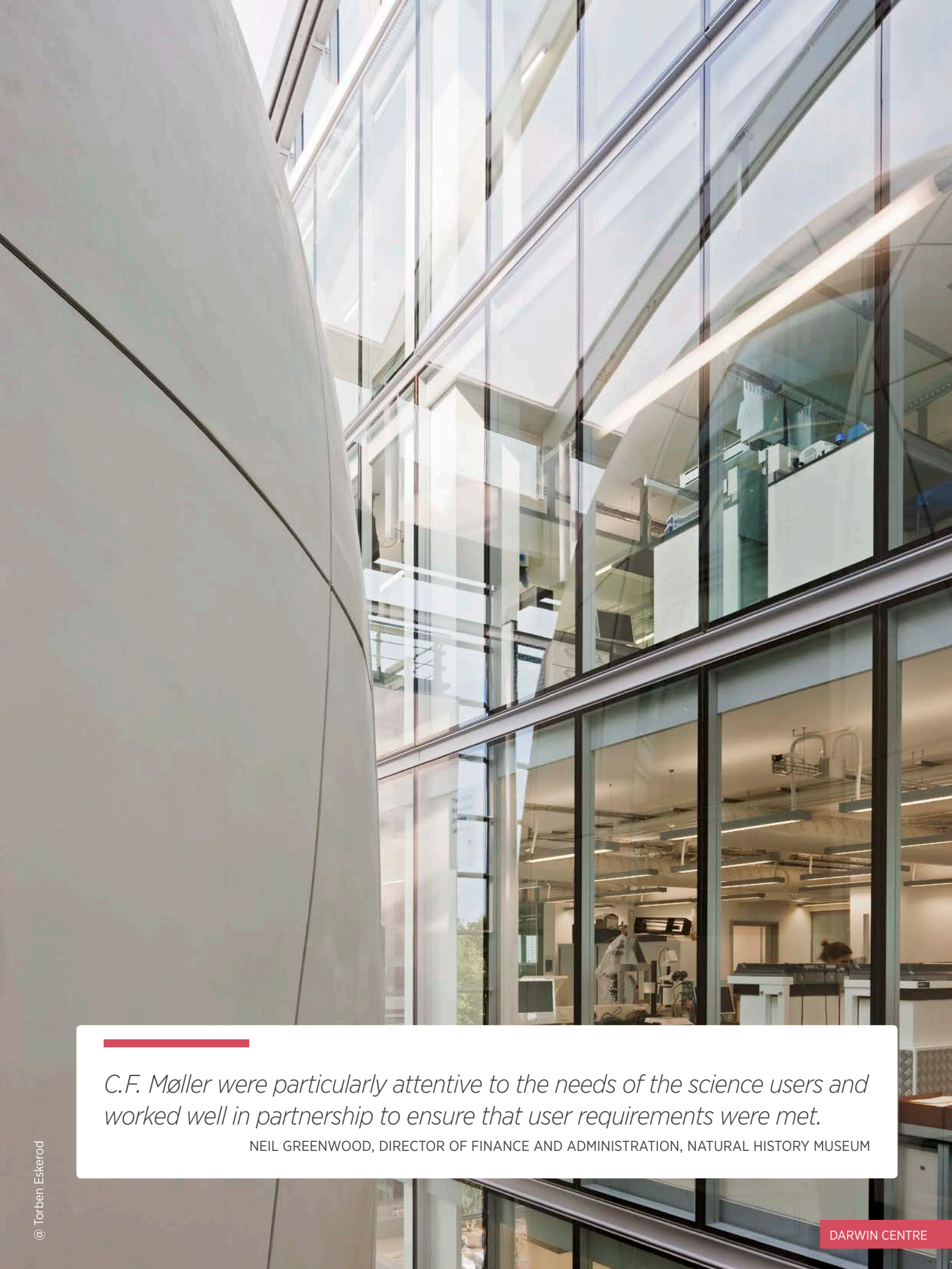
This can be seen in a variety of public and private projects like ferry and train terminals, hospitals, schools, concert halls, stadiums and research facilities.

We use very precise planning tools to collect data early on in any lab project. This process often requires collecting data from a large group of people that potentially includes many different perspectives, but gathering those differing viewpoints provides an invaluable foundation for our work.

The future users of the Maersk Tower had many wishes regarding how the architecture could help them live out their dream of the perfect lab facility that would help them excel in their field. Listening to and involving the users on this level requires well-proven methods and great collaboration skills. In this case The University of Copenhagen has been strongly involved from the very beginning till the very end through workshops, interviews and dialogue. During the work of designing the laboratories, C.F. Møller Architects have taken part in continuous dialogue with the users – professors, doctoral students and lab technicians – to secure influence for the future users and ensure that all of the needs and wishes of the research groups have been elucidated.

Biomedicum is another great example when it comes to user-driven innovation in creating complex architecture ensuring long term-value for Akademiske Hus and Karolinska Institutet in Stockholm. In this project, wellbeing, flexibility and combining many faculties under one roof were the main focuses for the future users.

Our work on the Darwin Centre began in early 2002 and lasted until 2009. During the majority of that time the C.F. Møller architectural team was located within the Natural History Museum which gave us close and immediate access to the scientists and curators of the Life Sciences departments (botany, zoology and entomology). With a working group of scientists and curators, our team developed a series of open plan laboratories which are easily adaptable to the changing nature of research projects. The office/write-up areas were designed around flexible furniture that can be set up in various groupings and then quickly re-arranged to allow research teams to be formed and re-formed.



C.F. Møller were particularly attentive to the needs of the science users and worked well in partnership to ensure that user requirements were met.

NEIL GREENWOOD, DIRECTOR OF FINANCE AND ADMINISTRATION, NATURAL HISTORY MUSEUM

MAERSK TOWER

© Adam Mørk

FINDING SUSTAINABLE SOLUTIONS

Our vision is to improve life for people and planet and we share this ambition with our clients and collaborators when designing new research and lab facilities. By nature, a lab can be energy consuming and it is of the utmost importance to reduce this energy consumption for a more sustainable world. This can be achieved by modern technical solutions and innovative architecture.

The Maersk Tower is not only state-of-the-art when it comes to research and teaching facilities but also when it comes to sustainability. The sustainability strategy has been an integrated part of the building's design from the start. The Tower's shape, the layout of the floors and the façade solution are all examples of how the design of the building contribute positively to the Towers environmental footprint. In this way the sustainability initiatives appear as fully integrated in the overall building design and become a part of the aesthetic appearance of the building.

The Maersk Tower has been designed, built and certified as a Low Energy Class 1 building, with a primary energy consumption of 40 kWh/m^2, covering heating, cooling, ventilation, lighting and building services.

The façade of the Tower is divided into a relief-like grid structure of storey-height copper-covered shutters. The shutters function as movable climate shields, that automatically opens or closes according to direct sunlight, ensuring direct heat gain in the laboratories is kept to an absolute minimum. The shutters primarily shield against direct sunlight yet also allow daylight to filter through its fine-meshed perforations.

The Campus Park is a part of the wider sustainability strategy which includes improving the micro-climate and biodiversity and handling rain water locally. Excess water seeps down between the tiles, where it is collected in a large reservoir. The rooftop gardens of the lower buildings can also absorb extreme downpours. The surplus rain water from the park is used for example for the irrigation of the park and to flush the toilets in the building.

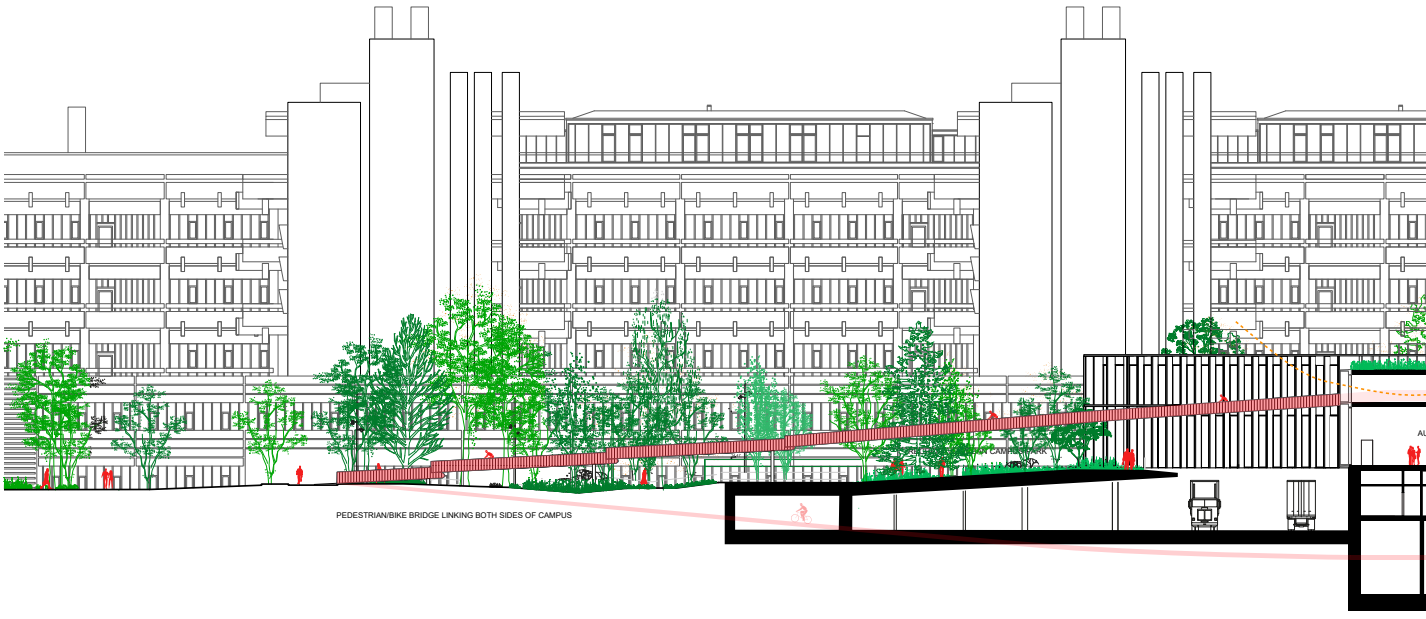
There are 1,400 bicycle parking places in the base of the tower, and an additional 2,000 on the surface of the campus landscape, with permeable metal plates upon which bicycles are parked, filtering oil spill from bicycle chains as they stand parked.

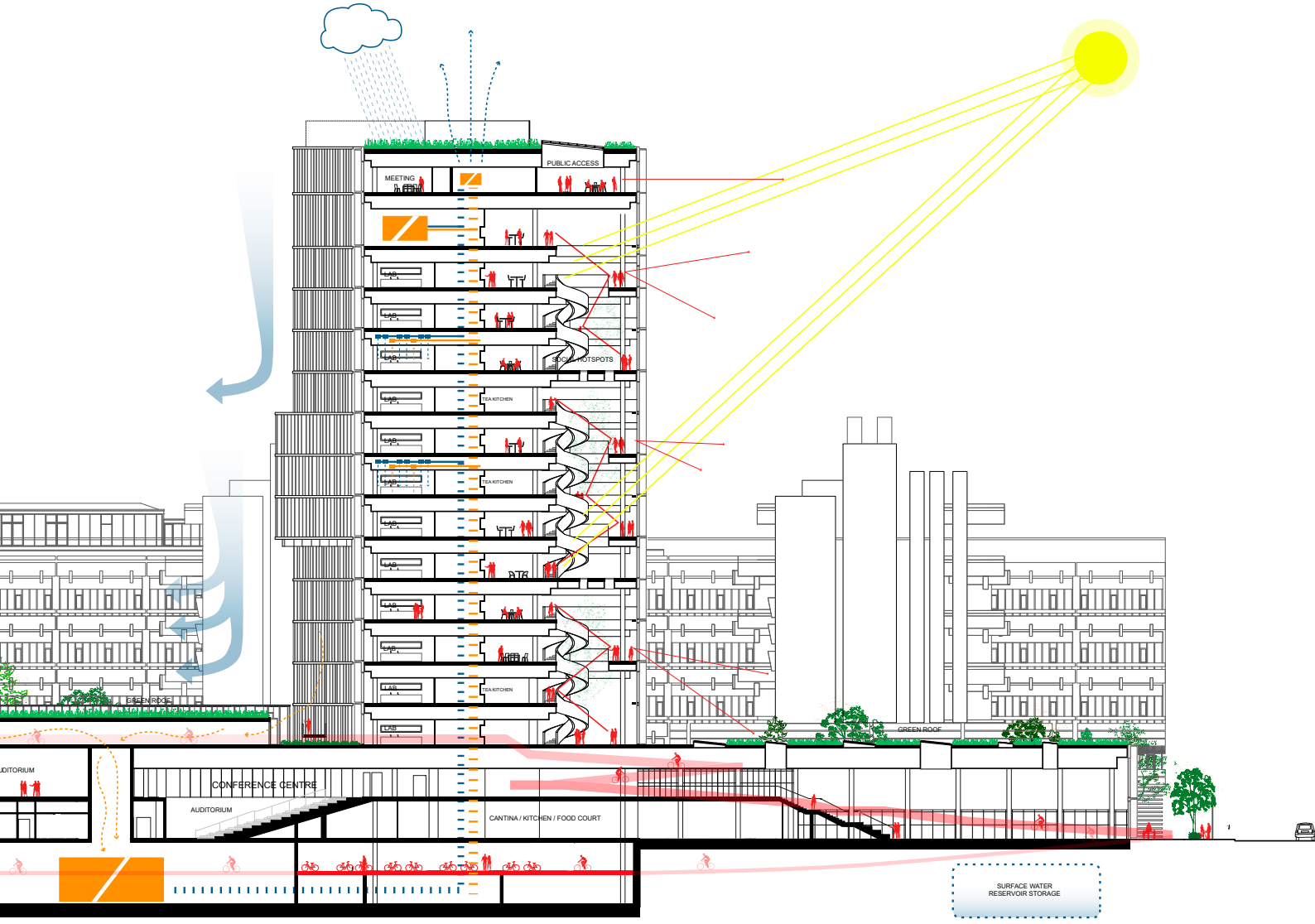
With this approach we have made the Maersk Tower the most energy-efficient laboratory building in Denmark. The building receives cold seawater from the Port of Copenhagen – like a climate-friendly district cooling system. District cooling is used to cool autoclaves, ventilation systems, server rooms etc. The facade, the position of the labs and the triangular shape of the building envelope reduces the need for cooling by minimizing the heat from the sun affecting the temperature in the building.

The main square facing the tower has been designed to withstand future climate changes, including heavy showers. Below the square in front of the building five million litres of rainwater can be collected.

This means that rainwater can remain on the site and will not strain the city's sewerage system in the event of extreme downpours. Surplus rainwater can seep through the flagstones, where it is collected in a large reservoir and purified in a fascine. Surplus water from the park is reused, among other things, for watering the park. Also, the roof gardens on the lower buildings are designed to absorb heavy showers.

The shutters of the façade function as movable climate shields, that automatically open or close according to direct sunlight, ensuring direct heat gain in the laboratories is kept to an absolute minimum. The shutters primarily shield against direct sunlight yet also allow daylight to filter through its fine-meshed perforations.




PUBLIC ACCESS
MEETING
LAB
SOCIAL HOTSPOTS
TEA KITCHEN
GREEN ROOF
CONFERENCE CENTRE
AUDITORIUM
CANTINA / KITCHEN / FOOD COURT
SURFACE WATER
RESERVOIR STORAGE

It is a big day for the University of Copenhagen, but it is also a very big day for Copenhagen as a city because the Maersk Tower is a gift to research, knowledge and education. But it is also a big gift to the citizens of Copenhagen because this is a beautiful tower and it also gives something to the city, with its ground floor and gardens, that we are very happy about.

FRANK JENSEN, MAYOR OF COPENHAGEN MUNICIPALITY


© Dragør Luftfoto

MAERSK TOWER

© Adam Mørk

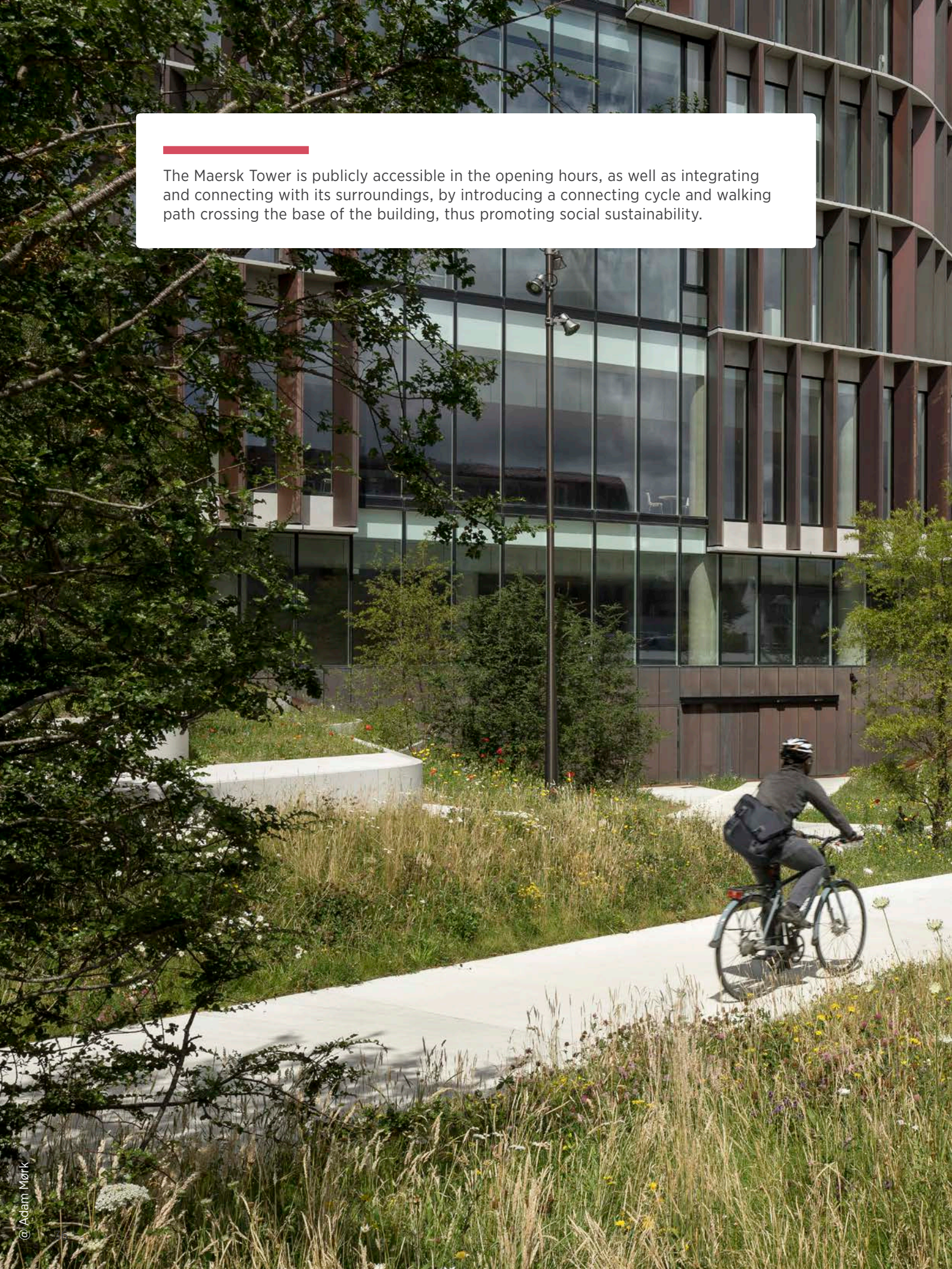
INTEGRATION THAT STANDS OUT

At C.F. Møller Architects we believe it is important to integrate buildings into their surroundings to the benefit of the users and people in general. With this holistic approach we ensure the building connects to its surroundings and stands out by contributing to a lively neighbourhood where every walk of life can meet and there is a strong and welcoming connection between society and science.

With its inviting, sustainable campus park and open square at the main entrance, the Maersk Tower is fully integrated with the surrounding neighbourhood. Like the rest of Panum, which the Maersk Tower is an extension to, the building is located at the centre of the Copenhagen Science City – one of the largest concentrations of education and research institutions in Europe.

The campus park is open to everyone and offers both outdoor study and common areas for staff and students and new, green outdoor experiences for the citizens of the neighbourhood Nørrebro. The green areas and connections across the area invite neighbours and citizens to sit down or pass through – on foot or bicycle.

The Maersk Tower is publicly accessible in the opening hours, as well as integrating and connecting with its surroundings, by introducing a connecting cycle and walking path crossing the base of the building, thus promoting social sustainability.



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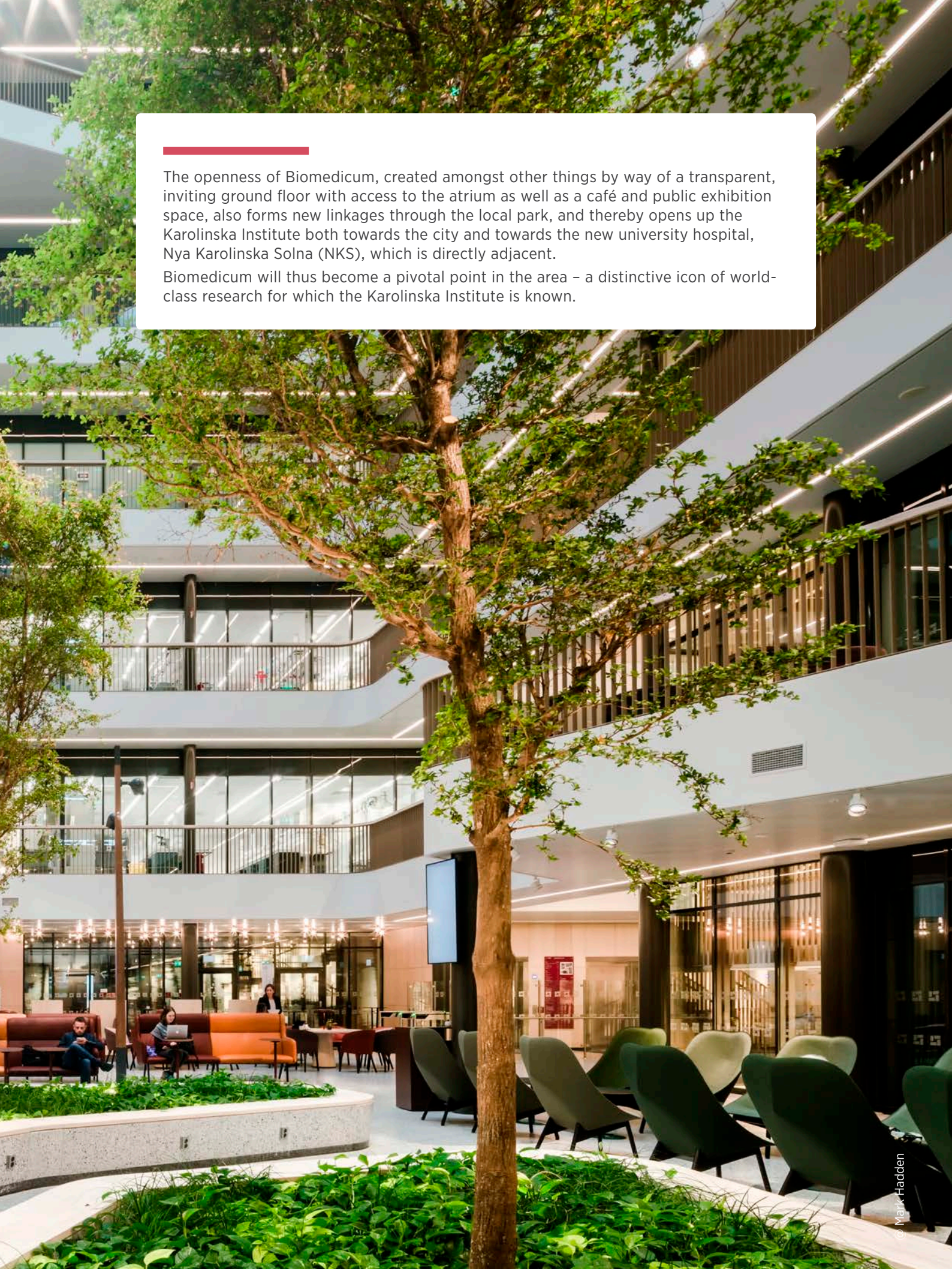
MAERSK TOWER

BIOMEDICUM



The openness of Biomedicum, created amongst other things by way of a transparent, inviting ground floor with access to the atrium as well as a café and public exhibition space, also forms new linkages through the local park, and thereby opens up the Karolinska Institute both towards the city and towards the new university hospital, Nya Karolinska Solna (NKS), which is directly adjacent.

Biomedicum will thus become a pivotal point in the area – a distinctive icon of world-class research for which the Karolinska Institute is known.

Prediction is very difficult, especially about the future.

NIELS BOHR

FLEXIBLE FOR THE FUTURE

The only thing we really know about the future is that it will be different from today and the answer to that challenge is to make flexible buildings and campus plans.

This means buildings and campuses that adapt effortlessly to new needs and demands, to new work-flows and changing ambitions. This demands an experienced team with insight in materials, layouts and technical possibilities and at C.F. Møller Architects we have increased this experience since the very beginning with the University of Aarhus.

A recent example of this is found at the Maersk Tower with the concepts of 'dancefloors' and flexizones.
A dancefloor is one big open floorspace without for example any services running to above or below. The effect of this is that each storey can be modified without disrupting adjacent storeys.

This gives a highly cost-effective flexibility which is further enhanced by the introduction of flexizones. These are flexible zones where office space and lab space are inter-related and can be adjusted according to which space requires increased capacity.

Flexizones and "dancefloors" makes it easy to transform each floor and make more space for either offices or labs.

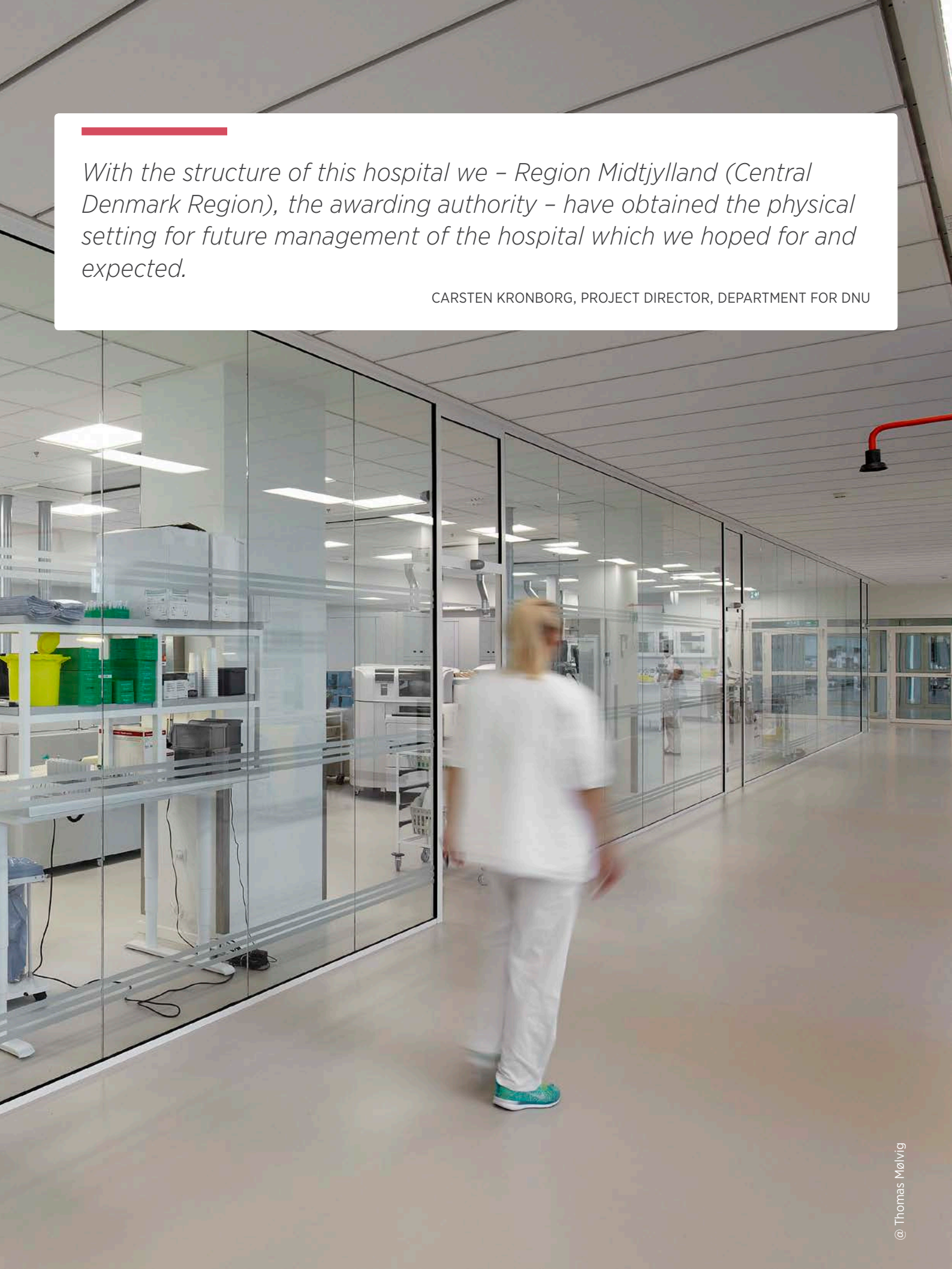
© Adam Mørk

MAERSK TOWER

AARHUS UNIVERSITY HOSPITAL – AUH, CENTRAL LABORATORY

With the structure of this hospital we – Region Midtjylland (Central Denmark Region), the awarding authority – have obtained the physical setting for future management of the hospital which we hoped for and expected.

CARSTEN KRONBORG, PROJECT DIRECTOR, DEPARTMENT FOR DNU



MAERSK TOWER

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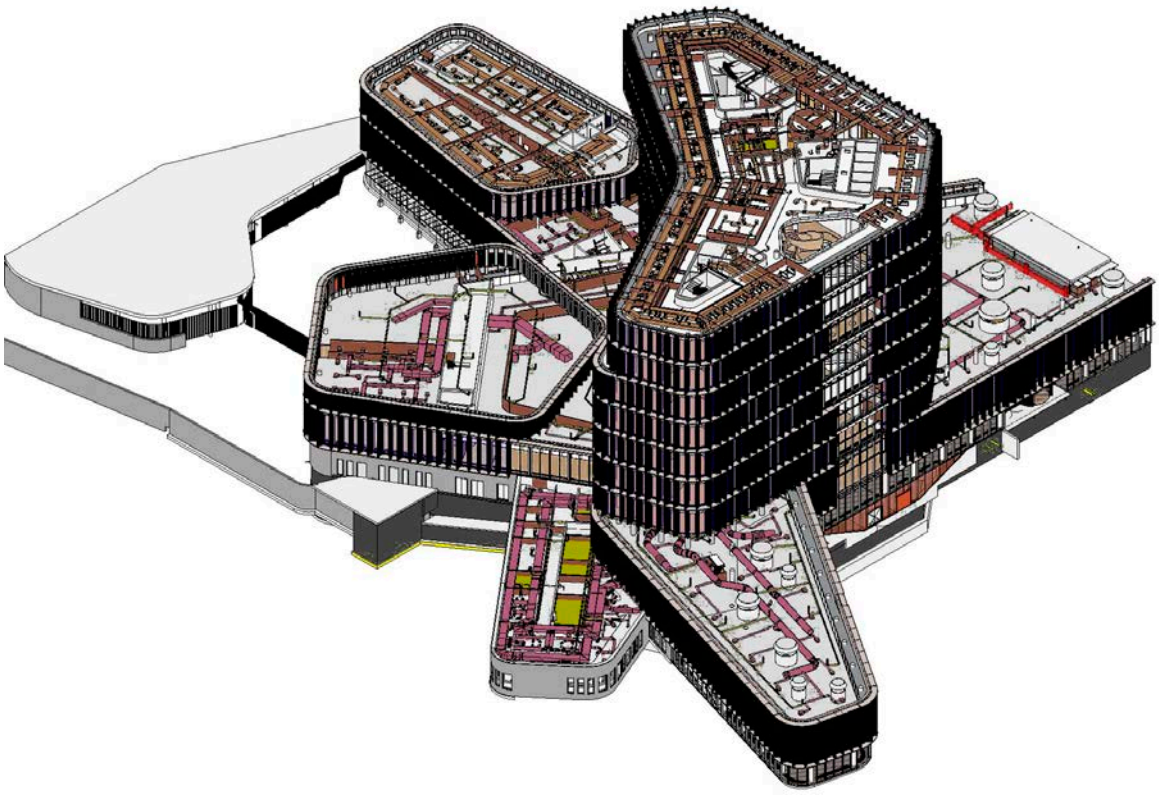
EXPERTS IN BIM

Designing research facilities demands precision at the highest level imaginable and the best tools possible. C.F. Møller Architects have been a global frontrunner in using BIM and have contributed to defining how the industry uses BIM as a tool.

BIM stands for Building Information Modelling. BIM is used to create digital models of the physical and functional characteristics of a building. It is also a working method, and a way of managing information during the construction process. Back in 2004, we already used BIM in the creation of the new Akershus University Hospital in Oslo.

Using BIM is a must for designing very complex buildings such as hospitals and research facilities. It is a tool of precision and it is the shared language between architects, engineers and users ensuring no mistakes are made. Using BIM is also a must for constantly tracking the progress of the building process to stimulate the work to be done on time and on budget.



The Maersk Tower creates the ideal framework for research and education at an international top level, and will also be crucial for the health of the Danish population in the future.

PROFESSOR, DMSC AND DEAN FACULTY OF HEALTH SCIENCES,
UNIVERSITY OF COPENHAGEN, ULLA WEWER

© Adam Mørk

MAERSK TOWER

EXTENSION OF THE PANUM COMPLEX AT THE UNIVERSITY OF COPENHAGEN

The Maersk Tower is a state-of-the-art research building whose innovative architecture creates the optimum framework for world-class health research. At the same time, it aims to contribute positively to the surrounding neighbourhoods.

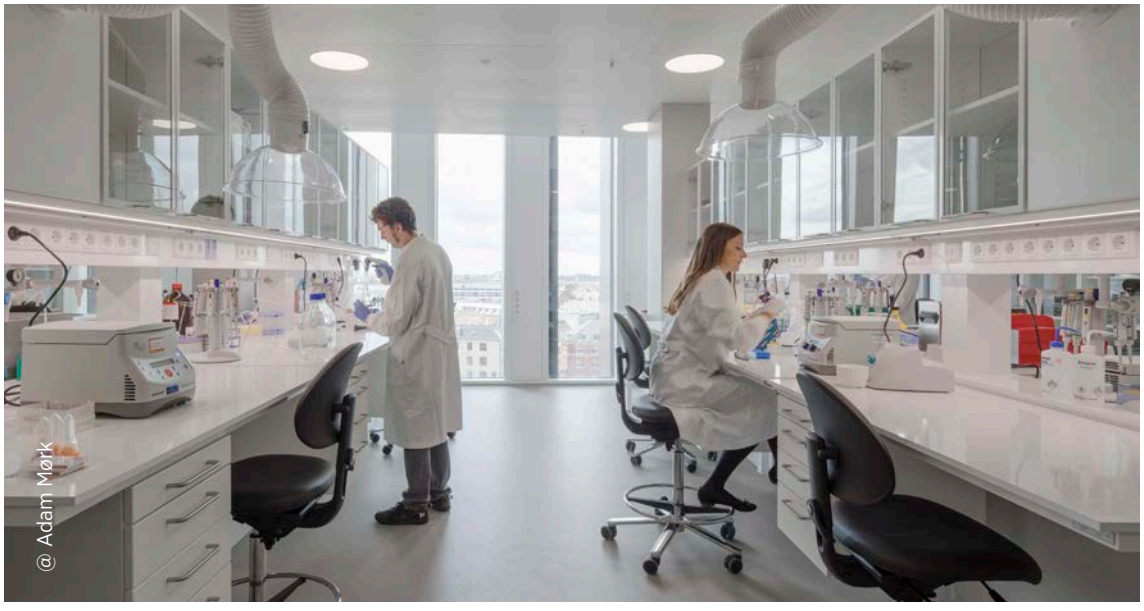
The tower is a part of Copenhagen University and contains research and education facilities and a conference center. By selecting a tower typology, there is greater allowance for a green and urban campus park, which is open to everyone and therefore involves and develops the surrounding neighbourhood.

The Tower rests on a low star-shaped base which contains shared and public facilities. With its transparent façade, the entire base appears open and welcoming and at the same time this transparency allows the interior of the building to blend in with the external green landscape.

The Tower itself holds all research facilities, in innovative and modern laboratories. On each floor the Tower's functions are linked together in an efficient loop, which provides shorter travel distances and strengthens opportunities for teamwork. A continuous sculptural spiral staircase visually and physically connects the open fifteen floor atrium, creating an extensive three-dimensional sense of space.

The façade of the Tower is divided into a relief-like grid structure of storey-height copper-covered shutters. The shutters of the façade function as movable climate shields, which automatically open or close ensuring a comfortable indoor climate. At the same time the shutters provide a deep relief effect to the facade, breaking down the considerable scale of the Tower.

The Maersk Tower hosts Denmark's most energy-efficient laboratories, making the building a pioneer of energy-efficient laboratory construction.



© Mark Hadden

BIOMEDICUM

A new, cutting-edge laboratory building provides a unifying powerhouse for research at one of the world's leading medical universities – the Karolinska Institute in Stockholm.

The new laboratory building, Biomedicum, is to be the powerhouse for research at the Karolinska Institute in Stockholm, one of the world's leading medical universities, known amongst other things for selecting the recipients of the Nobel Prize in medicine and physiology.

Previously, the research environments of the Karolinska Institute were scattered throughout the campus – a green park area with red brick buildings dating from the 1930s. With Biomedicum, the Karolinska Institute has gained a single unifying environment for future research, with ultra-flexibly equipped laboratories and office facilities that act as a catalyst for cross-cutting collaboration between the various research and study environments.

The new construction is not only intended to provide a building in the campus park, but also to accommodate the park within the building. With a glass-covered green atrium, the outdoor campus area is continued through the building, thereby reinforcing the social qualities of the green campus to the benefit of knowledge-sharing and interdisciplinarity.

@ Mark Hadden

DARWIN CENTRE – PHASE II

The second phase of the Darwin Centre is an extension of the famous Natural History Museum in London, taking the form of a huge eight-storey concrete cocoon, surrounded by a glass atrium.

The Natural History Museum is both one of the UK's top five visitor attractions, and a world-leading science research centre. The architecture of the Darwin Centre reflects this dual role, and reveals to the public for the first time the incredible range and diversity of the Museum's collections and the cutting-edge scientific research they support.

The centrepiece is made to appear like a large silk cocoon, and forms the inner protective element that houses the museum's unique collection of 17 million insects and 3 million plants. The shape and size give the visitor a tangible understanding of the volume of the collections contained within. The regulation of temperature and humidity reduce the risk of pest infestations ensuring that the collections will be protected and preserved for many years to come. The exposed thermal mass of the continuous sprayed reinforced concrete shell maintains a stable internal environment and minimizes energy loading. More than 300 scientists work here in earth and life sciences in the research labs, library and archives.

Public access to the scientific core of the second phase of the Darwin Centre takes the form of a visitor route up and through the cocoon, overlooking the science and collection areas. Visitors can experience the Darwin Centre as a compelling and interactive learning space, observing the scientific and research activities without interrupting scientific work in progress.

@ Torben Eskerod

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THE TECHNICAL FACULTY

UNIVERSITY OF SOUTHERN DENMARK

The Technical Faculty (Faculty of Engineering) is part of the University of Southern Denmark in Odense, and constitutes a shared research and education environment for four different institutes.

The building is designed as one big envelope consisting of five houses connected by bridges at multiple levels crossing the heart of the house, a “piece of furniture” containing common functions and meeting rooms, and giving access to a roof garden/café/lounge area. The many connections allow for more fluid boundaries, and more community and knowledge sharing.

The building is shrouded in an external screen revealing and shading the transparent volume. The elegant and seemingly weightless screen is made from pre-fab panels of white CRC concrete (Compact Reinforced Composite, a special type of Fibre Reinforced High Performance Concrete with high strength) featuring circular openings with an underlying solar screen and natural ventilation. The unusual screen reflects the innovation and creativity that characterises the various institutes.

The interior layout creates great flexibility, with the larger labs located on the ground floor, for easy access to the terrain and opportunity for outdoor activities.


© Thomas Mølvig
© Thomas Mølvig

AARHUS UNIVERSITY HOSPITAL

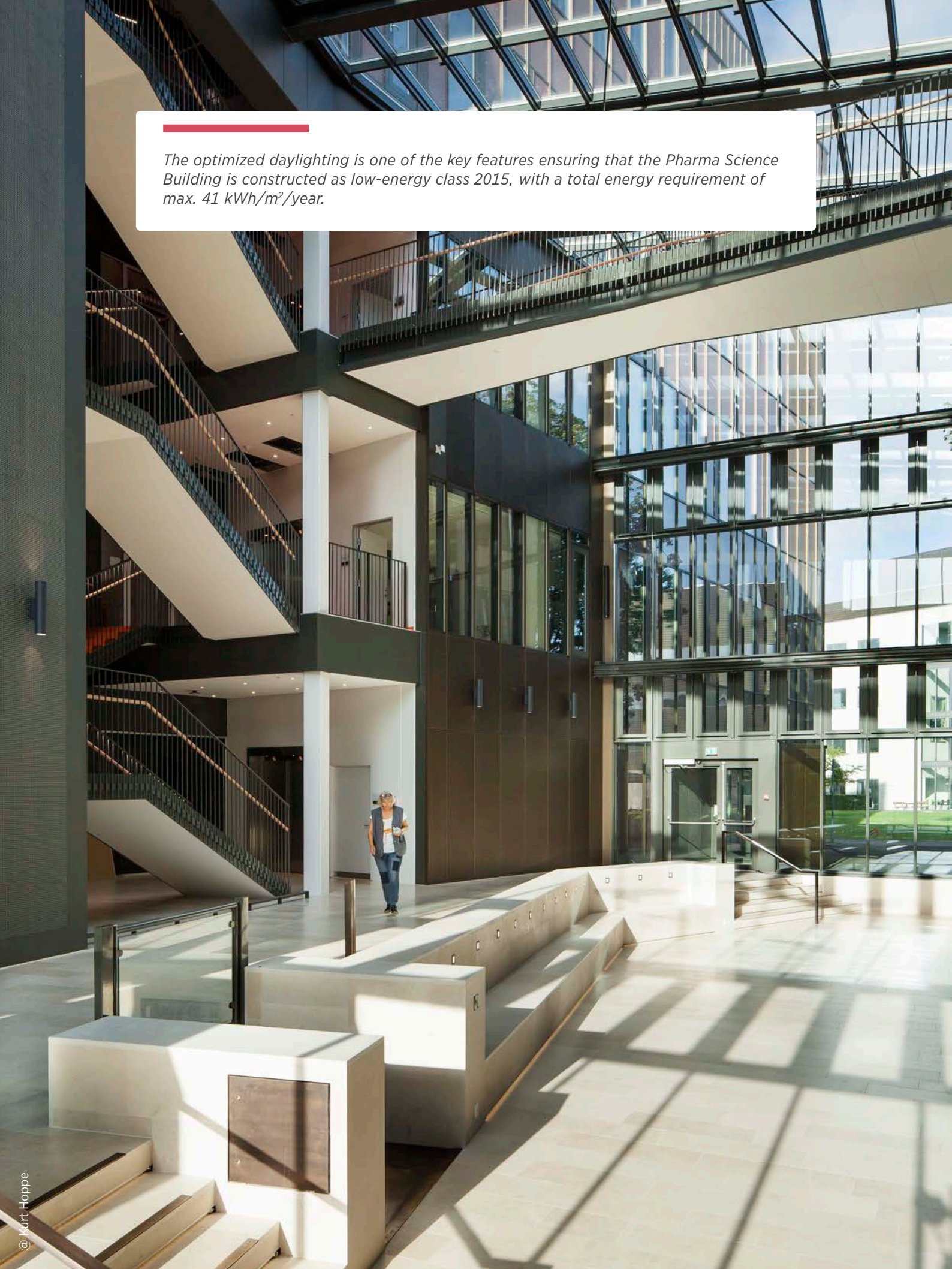
The largest hospital project in the history of Denmark, the New University Hospital in Aarhus, has been added to the existing Aarhus University Hospital in Skejby to create one overall hospital complex.

The resulting hospital-city is the size of and has been laid out in the image of an archetypal small Danish town, rising towards the centre around a tall landmark building. It is also Aarhus' largest workplace. The hospital complex is structured with a hierarchy of quarters, streets, plazas and squares, to create a diverse and lively green urban quarter, and enable intuitive way-finding for its users. Systematic use of knowledge- and evidence-based design means that the concept of "healing architecture" has influenced the design of the hospital – from the layout of single-bed wards, to the use of daylight and light inflows, to the design of landscape and garden spaces. The hospital is also designed to flexibly meet future requirements of technology, treatment methods and working routines.

The overall complex is divided into professional communities with their own identities. This ensures a clear structure, based on three elements: a two-storey base with treatment functions; wards above the base up to a height of four storeys; and in the middle the "Forum" central arrival area, where public functions are located at the foot of a 13-storey centre point acting as a point of orientation.

As a central function of the new hospital, the laboratories for pathology and clinical biochemistry offer employees the latest technical facilities in a physical environment with an emphasis on natural light, exclusion of noise from the open laboratory areas and communication and interaction amongst employees.

They include a number of special laboratories, including laboratories for immunosuppressants, turmeric markers, special endocrinology, allergy and autoimmunity, special coagulation, special haematology, biochemical molecular biology as well as psychotropic drugs and substance abuse. The majority of samples are delivered using pneumatic-tube systems and are analysed 24/7 using an automated process.



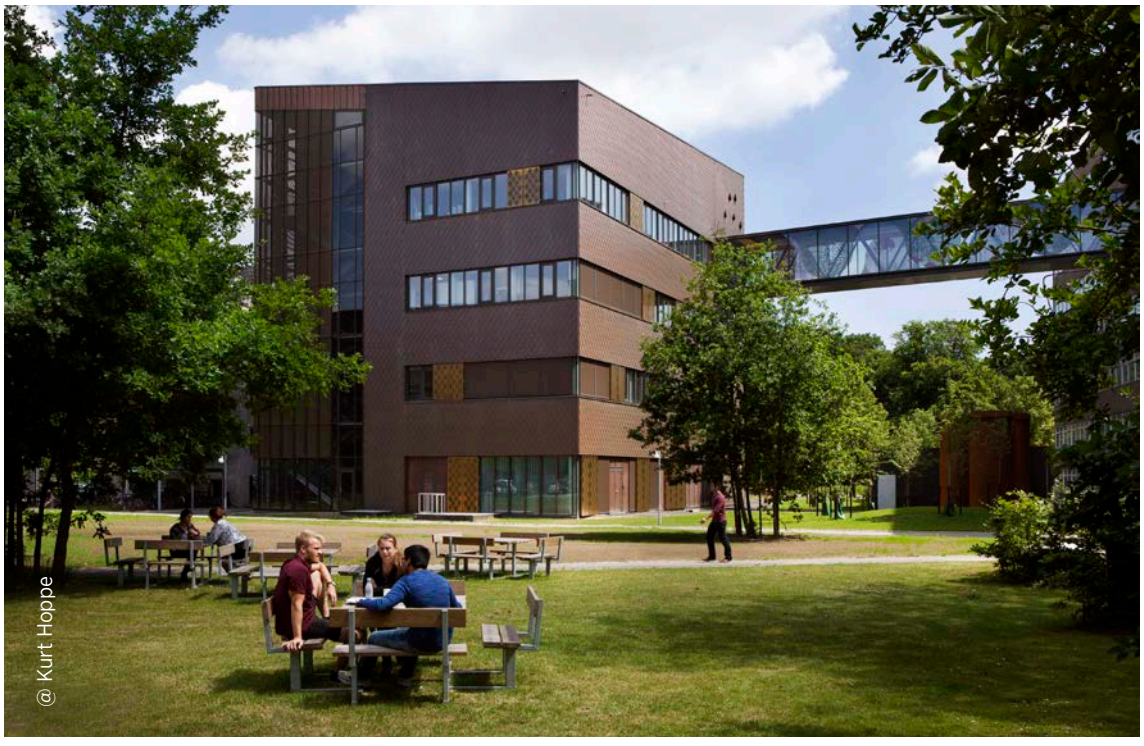
The optimized daylighting is one of the key features ensuring that the Pharma Science Building is constructed as low-energy class 2015, with a total energy requirement of max. 41 kWh/m²/year.

PHARMA SCIENCE

The Pharma Science Building is a new, modern laboratory building for the Faculty of Pharmaceutical Sciences as part of the University of Copenhagen's Faculty of Health Sciences at the North Campus.

The Pharma Science Building is to be the focal point for the Health Sciences faculty. New and existing buildings are connected by an atrium and indoor walkways, and interdisciplinary research collaborations between several institutes are made possible by providing new laboratories and shared facilities.

The compact volume is sculpted with a twisted floorplan, which creates a more spacious atrium and provides more facade length within a limited building zone. The facades are clad with a continuous skin of tombak panels in a rhomboid pattern, so that the building appears as a single geometric shape – only interrupted and intersected in strategic, generous openings that allow views both in and out. The dark tombak of the facades will contrast subtly against the existing buildings' light facades.



@ Kurt Hoppe

© Mark Syke

THE PANUM COMPLEX

REFURBISHMENT OF LABS

Alongside our work on the extension of the Panum complex, C.F. Møller Architects also has a separate framework agreement for the renovation of the existing Panum complex. The work includes refurbishment of laboratories, exterior renovation, building maintenance and minor extensions.

The laboratories and office areas have a friendly and open appearance, with bright new surfaces and glass in the ceilings, floors and walls. Glass walls provide light and transparency, with translucent panels where privacy is needed.

The laboratories are designed so they can be approved for GMO Class 1, Class 2 and GMO class animals without compromising the possibilities of the spaces to also promote opportunities for social and professional interaction and knowledge sharing.

The laboratory design utilises a colour palette and surfaces which match the original concept developed by the Danish artist Tonning Rasmussen for the complex when it was built in the early 1970s. These colours are repeated in the design of the doors, radiators and radiator screens.

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DANISH TECHNOLOGICAL INSTITUTE

DANISH MEAT RESEARCH INSTITUTE

DMRI is a leading international centre of excellence and developer of innovative solutions for the meat industry. In its new settings at the Danish Technological Institute, the centre and its 120 employees are able to push development of better and healthier products even further in state-of-the-art research facilities – some of the world's most advanced in food production.

The new facilities include a research abattoir complete with cooking and smoking, integrated robotic workshops, ultra-modern microbiological and chemical laboratories (including laboratory facilities for the study of the occurrence of pathogenic bacteria in meat production), as well as offices and meeting facilities.

The centre is part of the Danish Technological Institute, built in the 1970s. The complex is laid out in a spiral shape in a green landscaped setting, and the individual institutes are designed in a simple and austere architecture with red brick and exposed concrete lintels. The new building is based on the same simple design idiom, but with more modern twists such as using pre-fabricated brick reliefs, and incorporating bay windows.

A large atrium facilitates open collaboration across the organization and connects the complex's two blocks. Already on arrival, customers are presented with the company's activities, via glazed openings in the lobby, revealing workshops and office space.

@ Torben Eskerod


@ Jan Kofod Winther

AARHUS UNIVERSITY – RESEARCH AND TEACHING LABORATORIES

The University of Aarhus, which dates from 1931, is a unique and coherent university campus with consistent architecture, homogenous use of yellow brickwork and adaptation to the landscape.

The university, with its extensive park in central Aarhus, includes teaching rooms, research facilities, offices, libraries, workshops and student accommodation. The university has a distinct homogeneous building style and utilization of the natural contours of the landscape. The campus has emerged around a distinct moraine gorge and the buildings for the departments and faculties are placed on the slopes, from the main buildings alongside the ring road to the center of the city at Nørreport. All throughout the campus, the buildings are variations of the same clear-cut prismatic volume with pitched roofs, oriented orthogonally to form individual architectural clusters sharing the same vocabulary.

The way the buildings emerge from the landscape makes them seem to grow from it, rather than being superimposed on the site.

The University has won renown and praise as an integrated complex which unites the best aspects of functionalism with solid Danish traditions in form and materials. C.F. Møller has directed the design of the university buildings from the beginning to the present day, including several recent retrofittings and renovations of existing laboratories and animal facilities, as well as the construction of new facilities, including GMO class 1 and 2 gene technology laboratories, all of which enable both higher scientific standard and reduced energy consumptions.

@ Julian Weyer

LABORATORIES, HAUKELAND UNIVERSITY HOSPITAL

The new Laboratory Building at the Haukeland University Hospital in Bergen is directly connected to the existing hospital, and houses laboratory facilities for both university and hospital use.

The new building brings together research laboratories and diagnostic laboratories for the daily work of the hospital. The individual storeys house various kinds of laboratories used in, for example, highly-automated biochemical analysis, microbiology, blood bank functions and genetic research.

The complex is a total of 10 floors, as it was built on top of an existing parking garage. The new building is in very close proximity to the hospital buildings, so that the building's research and diagnostic laboratories act as a connector and shortcut between the university laboratory buildings to the east and the hospital's patient block to the west. While the proximity is an advantage functionally, it also meant that the building had to be located on a tight and narrow site, facing existing buildings to three sides and a natural rock face to the fourth.

The disadvantages of this constricted, low-light location led to extensive use of glass in the roof, facades and interior walls to maximize natural light, views and openness. A nine-storey atrium brings light deep into the building, traversed by footbridges spanning between offices and laboratories.

The building meets the high standards of functionality, technology and hygiene in highly flexible laboratories with directly adjacent workplaces. Functional accuracy and clinical purity is also expressed in the precise and colourful glass facades, as a visual counterbalance to the surrounding concrete buildings.

@ Jørgen True

C.F. Møller Architects is owned by a partner group consisting of Klaus Toustrup, Julian Weyer, Lone Wiggers, Mads Mandrup Hansen, Klavs Hyttel, Michael Kruse, Mårten Leringe, Christian Dahle as well as Lone Bendorff.

COMPANY PROFILE

C.F. Møller Architects is one of Scandinavia's leading architectural firms, with 90 years of award-winning work in the Nordic region and worldwide.

Every day we create architectural quality based on innovation, experience and Nordic values. This assures sustainable and aesthetic solutions with lasting value for clients, occupants and society.

A UNIQUE DESIGN APPROACH

Our design solutions are methodically and holistically created following a rigorous analysis of the local context. We look to set new global standards by fostering a design approach which uniquely integrates urban planning, landscape, architecture and design of specific building components.

We regard environmental concerns, resource-consciousness, healthy project finances, social responsibility and good craftsmanship as essential elements of our work. This ethos is fundamental to all our projects, a thread which runs from masterplanning to detail design.

Since our founding in Denmark in 1924, we have contributed significantly to the development of welfare societies in Scandinavia and the rest of the world. We are continuously recognised and awarded internationally for setting new architectural standards, due to our strong focus on the functional, artistic and social value of architecture.

Today C.F. Møller Architects has app. 300 employees. We have offices in Aarhus, Copenhagen, Aalborg, Oslo, Stockholm and London.

See more at www.cfmoller.com

CORE VALUES

VISION

Our vision is to improve life for people and planet.

MISSION

Our mission is to holistically create solid, quality solutions based on Nordic values adapted to future global challenges.

ASPIRATION

We aspire to be global influencers by caring for the local context based on innovation, quality and sustainability.

PROMISES

We promise longevity and clever solutions in everything we create by delivering design that can pass the test of time and serve both clients and users with great value from start to finish.

SPIRIT

Our company team spirit is based on simplicity, clarity, honesty, openness and passion.

VALUES

Our values are strongly focused on professionalism, credibility, quality, innovation, agility and loyalty.

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