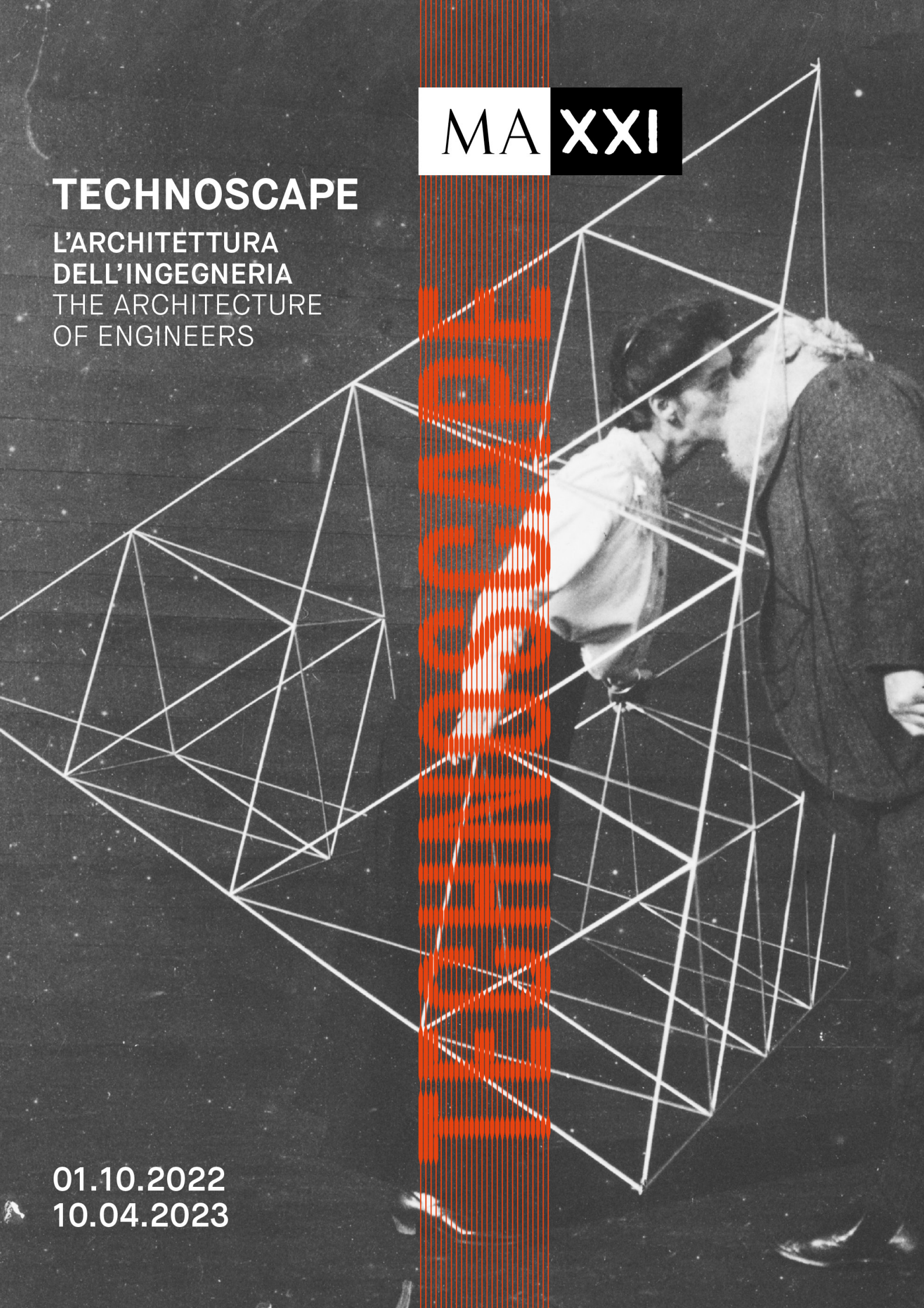


MA XXI

TECHNOSCAPE

L'ARCHITETTURA
DELL'INGEGNERIA
THE ARCHITECTURE
OF ENGINEERS

01.10.2022
10.04.2023



TECHNOSCAPE.

The Architecture of Engineers

Architecture, structural engineering and digital culture: from iconic buildings such as the Sydney Opera House, the Beaubourg in Paris and the works of Pier Luigi Nervi, all masterpieces of structural engineering, to hyper-light concrete, plant fibres as building materials, spacesuit design as experimentation on sustainable textiles, and landscape as an agent against catastrophes.

Present and future 'engineering' on show at MAXXI

curated by Maristella Casciato and Pippo Ciorra

1st October 2022 – 10th April 2023

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Rome, 30th September 2022. A major exhibition is opening at MAXXI which investigates the relationship among architecture, structural engineering and ecological, technological and digital innovation, all increasingly crucial for our relationship with space and our planet.

The story starts with iconic buildings such as **Nervi's Palazzetto dello Sport (Sports Arena) in Rome, Frei Otto's Olympic Multihalle or the Beaubourg in Paris**, and extends to structural masterpieces from all over the world: **Ove Arup's Sydney Opera House**, Lina Bo Bardi and Figueredo Ferraz's **São Paulo Museum**, **Buckminster Fuller's domes**, **Mahendra Raj's Hall of Nations** in Delhi, **Beda Amuli's market in Dar Es Salaam** or the masterpieces by **Mamoru Sasaki** and other Japanese structural engineers. All such buildings would not have seen the light of day without **the extraordinary collaboration between architects and engineers**. Building upon this reconnection in space and time, the exhibition casts a glance into the future through the installations and experiments of **seven university research centres from around the world**, from MIT (Massachusetts Institute of Technology) to Princeton through to the main European polytechnic universities, including the IUSS in Pavia.

All of this is **TECHNOSCAPE. The Architecture of Engineers**, as curated by **Maristella Casciato** and **Pippo Ciorra** with **Eni** as the main partner. The exhibition, which will be hosted by **MAXXI from 1st October 2022 to 10th April 2023**, is an important new addition to the Museum's research strand investigating the relationship among art, architecture, science and new technologies.

There are two main reasons why such an exhibition has been organised in a museum of art and architecture. Firstly, there is the conviction that the current political and social ecological urgencies have brought artistic and scientific disciplines very close together – thus the two 'different sisters' architecture and engineering – as it has already happened at other times in history. Secondly, there is the impression that engineering is at a major turning point: from modernist structures made of reinforced concrete, iron and glass to a myriad of new materials; from construction to the development of tools and strategies to make buildings sustainable; from calculation to algorithm; from male dominance to very pronounced gender diversity.

Giovanna Melandri, President of Fondazione MAXXI, comments: "**TECHNOSCAPE** is a manifesto-exhibition for us, since MAXXI is the National Museum of Modern and Contemporary Architecture that Italy one lacked, a point of reference and a debate venue with a global and interdisciplinary scope. The overall aim is to rekindle attention on the themes of urban life, sustainability policies, and the protection of the environment and regions. Because it is in our DNA as a museum-laboratory, we also want to explore and experiment with dialogue among creativity, knowledge and different techniques. This encyclopedic and spectacular exhibition is fully in keeping with the spirit of the times, which calls for collaboration between the arts, sciences, and social sensibilities. It is Ursula von der Leyen's approach to the New European Bauhaus, and it is the spirit that fuels the GRANDE MAXXI project, an interdisciplinary pole projected into the future and entirely congruent with the exhibition **TECHNOSCAPE**."

Fondazione MAXXI | Museo nazionale delle arti del XXI secolo Ministero della Cultura

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In the words of curators **Maristella Casciato** and **Pippo Ciorra**, "*TECHNOSCAPE* is a very important exhibition because it not only brings to light the contribution of great structural designers to the history of architecture, but also because it casts a wide-ranging glance at the future of engineering and its increasingly evident shift from the world of structures to that of technology, new materials, environmental action, digital manufacturing and robotics, as investigated here through collaboration with seven prestigious university research centres from all over the world."

THE EXHIBITION ITINERARY

The story revolves around two strands: **construction engineering** and **technological innovation**. The first section, which is divided into eight thematic areas, features more than **40 masterpieces from the Post-war period to the present day**, often the result of extraordinary collaboration between structural designers and masters of architecture such as **Frank Lloyd Wright, Le Corbusier, Jörn Utzon, Louis Kahn, Renzo Piano, Rem Koolhaas, SANAA, Toyo Ito, Zaha Hadid, Kengo Kuma, Christian Kerez** and many others.

On display are drawings, models, archive documents, videos and photographs, including those by **Walter Niedermayr, Iwan Baan, Ezra Stoller, Leonardo Finotti** and **Olivo Barbieri**, to name but a few. The current drive of engineering towards ecological engagement and technological experimentation is instead investigated through the installations of seven university research centres from around the world: **ETH Zurich, University of Stuttgart, Technische Universität Berlin, the University for Applied Arts Vienna, Massachusetts Institute of Technology (MIT), Princeton University and the Eucentre Foundation of the IUSS in Pavia, which specialises in earthquake engineering research.**

CONSTRUCTION ENGINEERING FROM THE POST-WAR PERIOD TO THE PRESENT DAY

Thin shells: projects based on the statics of thin, often non-elementary concrete surfaces. On show are works by historical authors such as Felix Candela, Heinz Isler, Pier Luigi Nervi and Sergio Musmeci, and others by important masters of the contemporary scene, such as Arup studio or Mutsuro Sasaki, a frequent partner of Toyo Ito and SANAA. *The Sydney Opera House*, which was designed by Jørn Utzon and Ove Arup, is an iconic building 'floating' in the bay and is a pivotal example of this structural typology.

Modular spans: 'assembled' structures composed of the repetition of elements that can be put together on site. An example of this is the *Kimbell Art Museum* in Fort Worth, Texas by Louis Kahn and August Eduard Komendant and its extension realised forty years later by Renzo Piano and Guy Nordenson: a building in wood, glass and concrete punctuated by columns.

Suspended Volumes: buildings whose structure has the task of supporting overhanging or elevated architecture. Examples are the legendary *MASP* by Lina Bo Bardi and José Carlos de Figueiredo Ferraz in São Paulo, a monumental glass bridge suspended between two enormous pre-compressed concrete beams painted red, or Affonso Eduardo Reidy and Carmen Velasco Portinho's *MAM* in Rio, inside the Flamengo Park, which rises from the ground while resting on concrete pillars, as if exploring the relationship among nature, art and structural technology.

Tall buildings: skyscrapers such as Frank Lloyd Wright's and Jaroslav Polívka's (*Johnson Wax*) 'towers' and the *HSBC* in Hong Kong (Arup for Norman Foster) or the *CCTV China Central Television Headquarters* in Beijing (Arup for Rem Koolhaas' OMA): two towers in the shape of an inverted 'L' form two overhangs suspended in the void that join 230 metres high, a real challenge to the force of gravity.

Grid structures: assemblies of three-dimensional modular elements. A recent example is the *GC Prothro Museum and Research Center* by Kengo Kuma and Jun Sato in Japan, an impressive building in which the façade decoration, a system of interlocking wooden elements, is also a structural element.

Domes: a focus on self-supporting coverings. The covering of the *Palazzetto dello Sport* in Rome is iconic in this sense: the use of 'ferrocement' and on-site prefabrication for lightweight ribbed domes is one of Pier Luigi Nervi's ingenious inventions.

Alternative materials: cases in which the characteristics of building materials are forced. Examples on display include Eckersley-O'Callaghan and Norman Foster's 'daring' carbon fibre covering resting solely on glass for the *Steve Jobs Theatre* in Cupertino.

Lightweight membranes: tensile structures. Examples are some of the legendary buildings of 20th-century architecture, such as the coverings for the Munich Olympics by Frei Otto and Günter Behnisch, the *Snowdon Aviary* by Frank Newby and Cedric Price in London, and the *Philips Pavilion* built by Le Corbusier together with Iannis Xenakis for the '58 Expo in Brussels. Another outstanding example is the *Yoyogi Sports Centre* by Tsuboi and Kawaguchi with Kenzo Tange, built in Tokyo in 1964, with splendid shell-shaped coverings made of steel suspension cables.

TECHNOLOGICAL INNOVATION: SCHOOLS AND RESEARCH CENTRES

Through installations created by seven university research centres from around the world, this section explores the future of engineering and its increasingly evident shift from the world of structures to that of technology, new materials, environmental action, digital fabrication and robotics.

KnitNervi by **ETH Zurich** (The Block Research Group – BRG, at the Institute of Technology in Architecture) is the installation in the MAXXI square inspired by Pier Luigi Nervi's pioneering Palazzetto dello Sport. Material research is also at the centre of the *Natural Fibre Tectonics* project of the **University of Stuttgart** (Institute for Computational Design and Construction), a structure made entirely of flax fibre woven using a robotic technique, a material that is completely renewable and biodegradable. *Large and light* is the project of **Technische Universität Berlin** presenting the results of its research on hyper-light concrete, a material of great strength, ease of use and reduced ecological impact.

The **Universität für angewandte Kunst in Vienna** presents *Reconfigurable Streets*, a project that renews the design of city streets under the banner of new post-Covid, sustainable and digital lifestyles.

The **MIT Media Lab Space Exploration Initiative** installation by the **Massachusetts Institute of Technology** presents a series of experimental spacesuits made of sustainable fabrics. **Guy Nordenson's** team at **Princeton** and the **Eucentre in Pavia** work instead on countering natural disasters. With *Resilient Coastlines: Forests and Adaptation*, the American team focuses on the effects of climate change in terms of rising sea levels, tsunamis and tidal waves. With *A world of risks or a world at risk?*, the Pavia team works on combating the effects of earthquakes, with a focus on our national territory.

THE CATALOG

The exhibition is accompanied by a rich catalog edited by Maristella Casciato and Pippo Ciorra (double Italian and English editions, 304 pages Forma editions) that traces the history of structural engineering and technological innovation from after World War II to the present. The book is constructed as an atlas, a handbook with voices and contributions from international critics addressing different themes: the editors' essays are flanked by technical studies on materials and patents and historical excursions. An important role is played by the iconographic apparatus, with author's photographs, newspaper clippings, documents and archival images. Closing the volume is a section devoted to the seven international university centers that are engaged in research and represent the most innovative perspectives in engineering. Texts by: Maristella Casciato, Pippo Ciorra, Lucia Allais, José Aragüez, Barry Bergdoll, Cristiana Chiorino and Mario Alberto Chiorino, Jean - Louis Cohen, Patricio del Real, Anat Falbel, Tullia Iori, Seng Kuan, Luca di Lorenzo Latini, Gina Morrow, Mohsen Mostafavi, Sarah Nichols, Guy Nordenson, Antoine Picon, Nina Rappaport.

PUBLIC PROGRAM

The exhibition is enriched by a rich program of events that will explore the connections between the structural engineering of the last century, high-tech design, and the impact of new technologies in all areas of our lives. A series of lectio magistralis, debates and popular lectures will highlight and reflect on the relationships between design, applied science, the environment, artificial intelligence, recycling science, sustainability and low-tech.

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