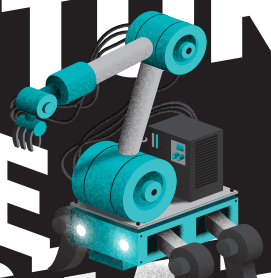
ARCHITECTURE IN THE AGE OF THE 4TH INDUSTRIAL REVOLUTION



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José Pedro Sousa
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João Pedro Xavier

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Architecture in the Age of the 4th Industrial Revolution

Volume 3

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eCAADe SIGraDi 2019

Architecture in the Age of the 4th Industrial Revolution

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Proceedings

The 37th Conference on Education and Research in Computer Aided Architectural Design in Europe

The 23rd Conference of the Iberoamerican Society Digital Graphics

Conference

11th-13th September 2019

Porto, Portugal

Faculty of Architecture

University of Porto

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WORKSHOPS

Workshop 5

A SPACE AND TIME TRAVEL BASED IN AR+VR TECHNOLOGIES: A RENAISSANCE FOUNTAIN AND A BAROQUE BELL-TOWER FROM COIMBRA TO FAUP

Mauro Costa Couceiro (CES-UC), Rui Lobo (DARQ-FCTUC CES-UC), Antonio Monteiro (UC)

In 2016, Renshaw, Sonnenfeld and Meyers proposed at the Human Factors and Ergonomics Society Annual Meeting the ground rules for a future development of a Turing type test for Virtual Reality, in order to pursue the objectives of the imitation game created by Alan Turing in 1950. This challenge, initially focused on aspects related with Artificial Intelligence, also promotes studies of how humans construct a judgment about the veracity and tangibility of their routine observations. Accordingly, in this workshop, a Virtual Reality Turing Test is shaped and used as a reference for the accomplishment of created immersive environments. The fusion of Virtual Reality and Augmented Reality, two emergent development fields that gave birth to what was recently coined as Mixed Reality, are combined to empathise the sensory and intellectual experience. To do it, several senses, mainly visual and auditory, are explored. The final composition will be constituted by a stereoscopically captured architectural element (a renaissance still standing tempietto and fountain) and a 45m high 3D modelled monastic baroque bell-tower (demolished in 1935 and which was visible from inside the Manga tempietto and fountain), both abruptly mixed with present Alvaro Siza´s building and the landscape environment.

eCAADe

www.ecaade.org

eCAADe (Education and Research in Computer Aided Architectural Design in Europe) is a non-profit making association of institutions and individuals with a common interest in promoting good practice and sharing information to the use of computers in education and research in architecture and related professions. The organization was founded in 1983, and organizes an annual conference, which is hosted by a different member University each year. eCAADe initiated and manages the very successful CumInCAD archive of research publications in the field of Computer Aided Architectural Design. **CumInCAD** is a valuable resource for researchers, educators and others in the field. eCAADe has also collaborated with sibling associations to create the International Journal of Architectural Computing (IJAC).

SIGraDi

www.sigradi.org

SIGraDi (The Iberoamerican Society of Digital Graphics) is a non-profit association that brings together architects, urban planners, designers and artists linked to digital media. Its main goals are to contribute to the academic debate on digital media and their applications, promote the production and advancement of scientific knowledge in general, and stimulate research and education in the current context of major technological changes.

Sibling Associations: ACADIA CAADRIA ASCAAD CAAD Futures

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fa.up.pt

With origins dating back to the XVIII century, the **University of Porto** (UP) is currently one of the most relevant education and research institutions in Portugal. Close to 31,000 students, 2,300 teachers and researchers along with 1,700 administrative staff attend its 15 schools and 69 scientific research units, spread across three University Campus located in the city of Porto.

As an organic unit of the UP, the **Faculty of Architecture of the University of Porto** (FAUP) is one of the most prestigious Portuguese and European institutions of education, research and innovation in Architecture. Located in Polo III (Campo Alegre), the building complex of FAUP is one of the most emblematic creations of Álvaro Siza's career, who was awarded with the Pritzker Prize 1992, and is an Emeritus Professor at FAUP. The School offers high quality courses, which include a Master Degree in Architecture (MIARQ), a PhD Programme in Architecture and an Advanced Studies Course in Architectural Heritage. The Center of Advanced Studies in Architecture and Urbanism (CEAU) manages the research activity at FAUP, which integrates the Digital Fabrication Laboratory (DFL) among other research groups. FAUP is thus a stimulating academic environment bringing together the traditions and the innovations in the discipline.

Today, we live in a moment of profound and accelerated changes in the way we perceive and interact with the world, which many authors do not hesitate to call as “the 4th Industrial Revolution”. Extraordinary advancements in areas like mobile communication, artificial intelligence, big data, cloud computing, blockchain, nanotechnology, biotechnology, facial recognition, robotics or additive manufacturing are fusing the physical, biological and digital systems of production.

Such technological context has triggered a series of disruptive concepts and innovations, like the smartphone, social networks, online gaming, internet of things, smart materials, interactive environments, personal fabrication, 3D printing, virtual and augmented realities, drones, self-driving cars or the smart cities. All together, they are drawing a radically new world.

Like in the past, if the world changes, the discipline of architecture cannot remain indifferent. It must understand and adapt to the new circumstances and also, why not, orient some of the undergoing transformations. Since digital technologies are at the core of the emerging paradigm, the eCAADe and SIGraDi Associations joined their annual Conferences in 2019, and invited researchers, professors, professionals and students in Porto at FAUP to debate how digital technologies are shaping the place and role of architecture in the age of the 4th Industrial Revolution.

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