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IAAC and the Barcelona Supercomputing Centre join forces to create an urban simulator and promote "the science of making cities"

- The Institute for Advanced Architecture of Catalonia (IAAC) and the Barcelona Supercomputing Centre (BSC) sign an agreement to implement supercomputing technology to assess the resilience of cities and the impact of urban projects and innovations.

- The partnership will work with international institutions under the urbanization.org initiative to build a collaborative and open tool that can digitally simulate any city in the world.

Researchers from IAAC and the Barcelona Supercomputing Centre - Centro Nacional de Supercomputación (BSC) will work on the creation of a digital platform that allows the simulation of cities in order to evaluate any urban plan, project or initiative and thus promote more efficient urban development with positive impact.

With this urban simulator, all the physical processes that are generated in all the layers that make up cities (mobility, energy, water, matter cycles, urban development and physical structure and society relations) will be translated into mathematical algorithms. Based on the study of neural networks and new artificial intelligence systems, the simulator will promote scientific knowledge of cities, their anatomy and urban analysis, while at the same time making it possible to use its research outcomes for the common good.

The technology is based on previous examples of simulators developed by BSC researchers such as **"Virtual Heart"**, a simulator of the human heart that allows to knowing how this organ responds to diseases, medicines and treatments. Now, with the agreement signed with IAAC, the application of supercomputing techniques from life sciences to urban sciences is being transferred with the aim of providing reliable solutions and answers to the challenges facing the cities of the future.

The urban simulator project is part of the **urbanization.org** initiative, promoted by IAAC together with other international organizations, with the aim of systematizing the knowledge of cities to create tools to improve decision-making in the field of cities. **Urbanization.org** encompasses projects that range from researching the taxonomy of the world's metropolises where cities and urban fabrics are catalogued as species to

mapping the world's public spaces for cities to collaborate, share practices and learn from each other.

The **urbanization.org** initiative was born last year on the occasion of the 150th anniversary of the *General Theory of Urbanization* authored by Barcelona's urban planner Ildefons Cerdá. The aim now is to promote the "science of making cities", using the technologies of the 21st-century digital revolution.

"We are at a stage where information technologies enable us to gain a better understanding of how cities work, in order to be able to make effective progress in the fight against climate change or social inequalities. This is why this initiative will allow us to combine the best of urban knowledge with the most advanced technologies", says **Vicente Guallart, IAAC's founder and former chief architect of the city of Barcelona**.

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About the Institute for Advanced Architecture of Catalonia (IAAC)

The Institute for Advanced Architecture of Catalonia (IAAC) is a centre for research, education, production and dissemination, based in Barcelona, with the mission of imagining the habitat of the future of our society and building it in the present. IAAC follows the digital revolution at all scales - from bits to geography, from microcontrollers to cities, from materials to territory - to push the boundaries of architecture and design and meet the challenges facing humanity.

About the Barcelona SuperComputing Center (BSC)

The Barcelona Supercomputing Center - Centro Nacional de Supercomputación (BSC) is the leading supercomputing center in Spain. It has the most powerful supercomputer in the country and one of the most powerful in Europe known as **MareNostrum**. Its specialty is high-performance computing, also known as HPC (High Performance Computing). Its function is twofold: to offer supercomputing infrastructures and services to Spanish and European scientists, and to generate knowledge and technology to transfer them into society.

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