

BUILDING MATTER WORKSHOP (amàco) is an educational resource center that aims to make visible, in sensory and poetic ways, the physicochemical behavior of the most common natural materials, such as sand, water, earth, wood, straw, etc.

The project aims to disseminate knowledge regarding their application in construction, so as to promote the emergence of eco-friendly practices. **amàco** brings together physicists, engineers, artists and architects, under the same roof. Magic, emotion and creativity are the watchwords of the project.

Such a project brings with it a new conception of the idea of progress and a new meaning to "cutting edge", enabling to reconsider the idea of innovation, in a context where it is no longer based on the discovery of a synthetic material with exceptional characteristics, but rather on a rediscovery of the intrinsic qualities of a natural material. Through an innovative teaching process, an opportunity is given to professionals, researchers, teachers, students, schools and the general public, to learn by making connections based on the pure intelligence of simplicity.



amàco is supported by Investissements d'Avenir through the governmental Initiatives for Excellence in Innovative Training programme (IDeFI) for a period of eight years, up until December, 2019.

The Grands Ateliers, bearer of the project, is associated with the École Nationale Supérieure d'Architecture de Grenoble, the Institut National des Sciences Appliquées de Lyon and the École Supérieure de Physique et Chimie Industrielles de Paris.

The project is implemented as part of the Cité de la Construction Durable, a conceptual framework integrating the whole construction cycle, from natural materials up to built spaces and their use, and whose implementation brings together universities, industries and local communities.

The **amàco** team invites all teachers, researchers, professionals and representatives of higher education institutions and research or vocational training organizations, local representatives, etc. interested in the Building Matter Workshop, to get in touch (contact information below).



Rhône-Alpes



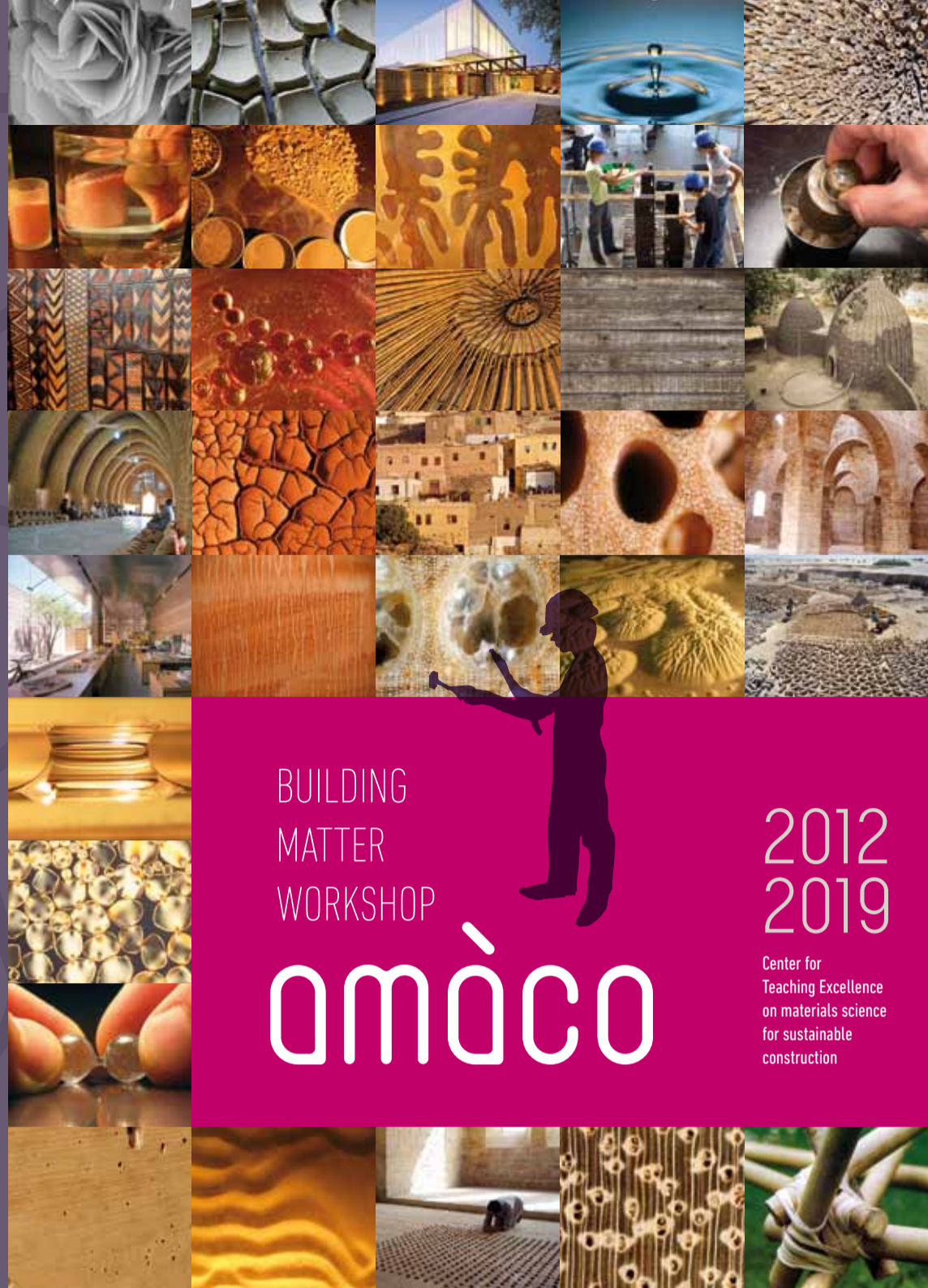
amàco BUILDING MATTER WORKSHOP

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BUILDING MATTER WORKSHOP

amàco

2012
2019

Center for Teaching Excellence on materials science for sustainable construction

PARTNERS

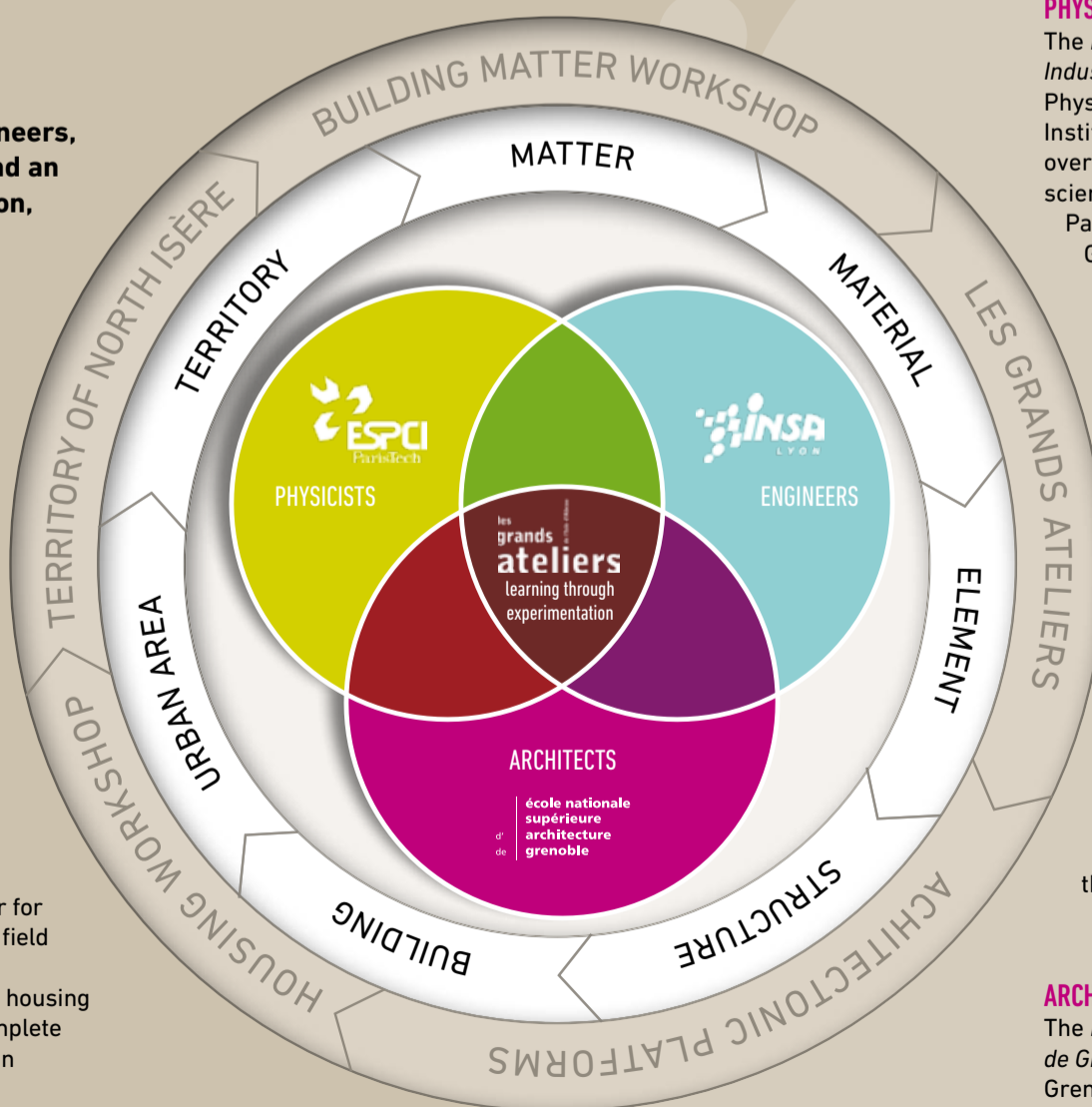
CONCEPT

Architects, artists, scientists and engineers, gathering at the Grands Ateliers around an innovative pedagogy of experimentation, focusing on the understanding of matter as a way to think and build differently. The **amàco** project aims at reconsidering all of the aspects that determine the construction cycle, starting with the land from which raw matter is extracted, the production of building materials, components, structures, buildings, human settlements, and finally addressing their integration as part of a given territory.

EXPERIMENTATION

The **amàco** project is managed by the Grands Ateliers – the Great Workshops (GAIA), a center for teaching, research and experimentation in the field of building construction. At the Grands Ateliers, life-size structures and housing prototypes can be constructed, allowing to complete the theoretical or virtual teachings developed in schools of architecture, art and engineering. The Grands Ateliers bring together higher education institutions and the *Centre Scientifique et Technique du Bâtiment*, in the framework of a public interest group (GIP).

"Understanding matter to think and build differently"



PHYSICISTS

The *Ecole Supérieure de Physique et Chimie Industrielles de Paris* – The City of Paris Industrial Physics and Chemistry Higher Educational Institution (ESPCI ParisTech) has attracted, for over a century, some of the most innovative scientific minds such as Pierre and Marie Curie, Paul Langevin, Frédéric Joliot-Curie, Pierre-Gilles de Gennes and Georges Charpak.

To convey the wonder of knowledge and stimulate curiosity and interest in science and experimentation are part of the mission of this institution

ENGINEERS

The *Institut National des Sciences Appliquées de Lyon* – National Institute of Applied Sciences of Lyon (INSA Lyon) is one of the largest French engineering schools. It hosts 23 research laboratories, 500 professors and researchers, 700 graduate students and 5000 students. INSA de Lyon offers 12 training curriculums; the Materials Science and the Civil Engineering and Urban Planning branches will be particularly involved in the project.

ARCHITECTS

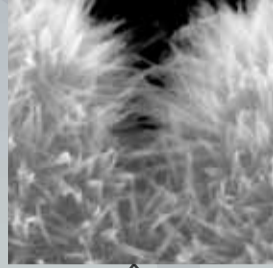
The *École Nationale Supérieure d'Architecture de Grenoble* – National School of architecture, Grenoble (ENSAG), through its laboratory CRAterre/Labex Architecture, Environnement and Cultures Constructives (AE&CC) is a world reference in the investment of local human and physical resources for sustainable construction.

THE BUILDING MATTER WORKSHOP is organized around five themes: granular matter, binding matter, liquid matter, soft matter, fibrous matter. The physico-chemical phenomena governing the properties of these five families of matter are highlighted through simple visual and sensory experiments.

GRANULAR MATTER
Matter consisting of mineral grains, such as is the case for concrete, for example, which is composed of a mixture of grains bonded by a binder. *Concrete, earth, mortar, plasters, sand, gravel and other aggregates.*



BINDING MATTER
Matter in the form of mineral pastes capable of hardening and agglomerating grains or fibers. *Portland cement, plaster, aerial and hydraulic lime, clay, natural cements, roman concrete, geopolymers.*



FIBROUS MATTER
Matter consisting of vegetal fibers, or fibers added to concrete mixtures. *Wood, straw, bamboo, reed, hemp.*



SOFT MATTER
Matter neither liquid nor solid, implemented as a paste, mud, an emulsion or a gel in construction. *Fresh cement, lime paste, clay mud, polymers, bitumen, paint, coatings and mortars.*



LIQUID MATTER
Interactions between water and building materials (freezing, thawing, condensation, evaporation, capillarity, corrosion, etc.). *All types of materials.*



MATTER

OBSERVE

DISCOVER

EXPERIMENT

UNDERSTAND

BUILD

MANIPULATE

MATERIAL

EACH OF THE FIVE THEMES refers to different construction materials, which are usually handled separately by production sectors in educational and industrial contexts. The idea is not to teach construction in wood, concrete, earth, straw, etc, independently, but rather to show the similarities and differences between these materials and to promote the transfer of innovative technologies between the different sectors.

ARCHITECTURE

AMÀCO AIMS AT EXPLORING the physical properties of matter and at understanding their application in construction. Practical exercises through the implementation of educational construction projects, will reveal links between the microstructure of matter and structural issues at the scale of the building.

"A material is not interesting for what it is but for what it can do for society"
John Turner

