XSCAPE. Material Minds: Exploring the Interactions between Predictive Brains, Cultural Artefacts, and Embodied Visual Search

Material Minds Project – basic Information

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Cover information

Funding entity:

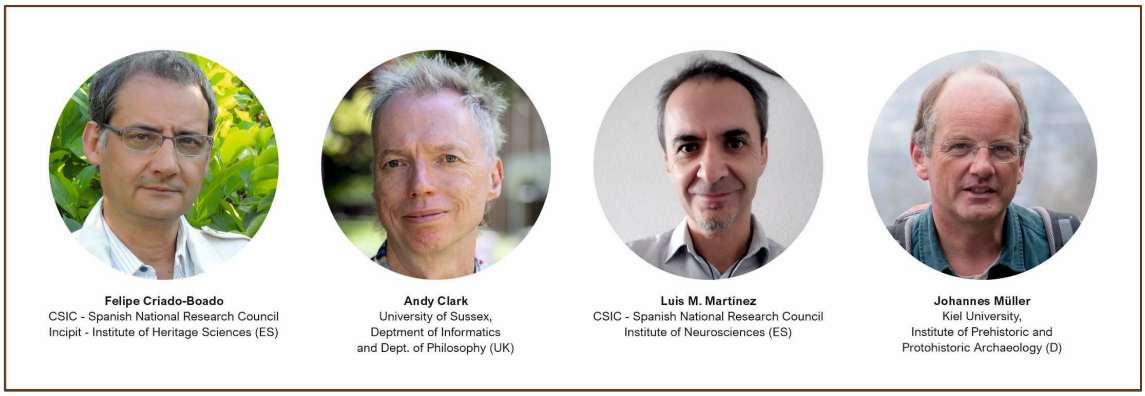
An ERC (European Research Council) Synergy Grant 2020 Project

Title:

Material Minds: Exploring the Interactions between Predictive Brains, Cultural Artefacts, and Embodied Visual Search

Acronomyn: XSCAPE

Why XSCAPE? We mean to capture the idea of many interacting arenas X (landscapes, cityscapes, artefact-scapes) each evolving on different timescales and involving different sets of opportunities and constraints.



Principal Investigators (PIs) and Host Institutions (HI):

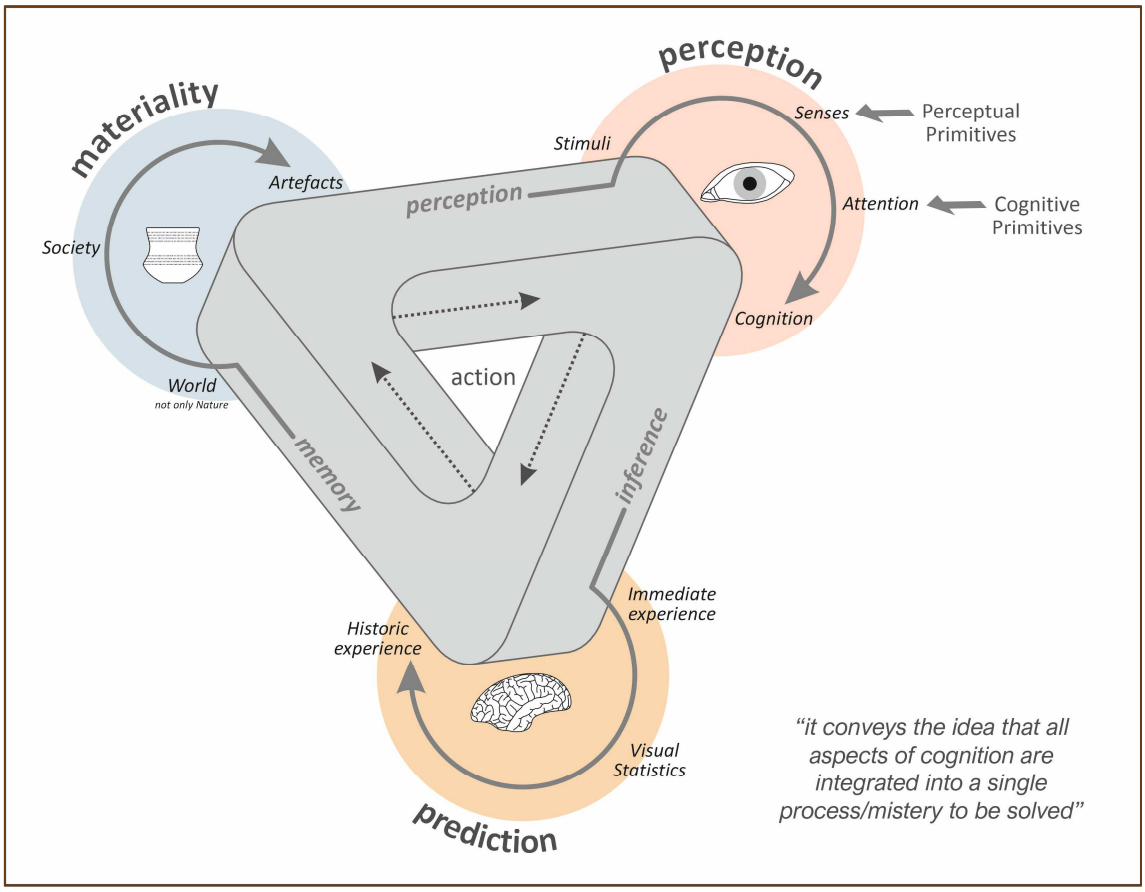
Corresponding Principal Investigator (cPI): **Felipe Criado-Boado**; Spanish National Research Council (CSIC), Institute of Heritage Sciences (Incipit) – Corresponding Host Institution, cHI). **Andy Clark**, University of Sussex, Department of Informatics and Department of Philosophy (UK); **Luis M. Martínez**, Spanish National Research Council-CSIC, Institute of Neurosciences-IN (SP); **Johannes Müller**, University of Kiel, Institute of Prehistoric and Protohistoric Archaeology (DE)

Duration: Six years (72 months)

Project start date: October 1, 2021

Project end date: September 30, 2027

The project



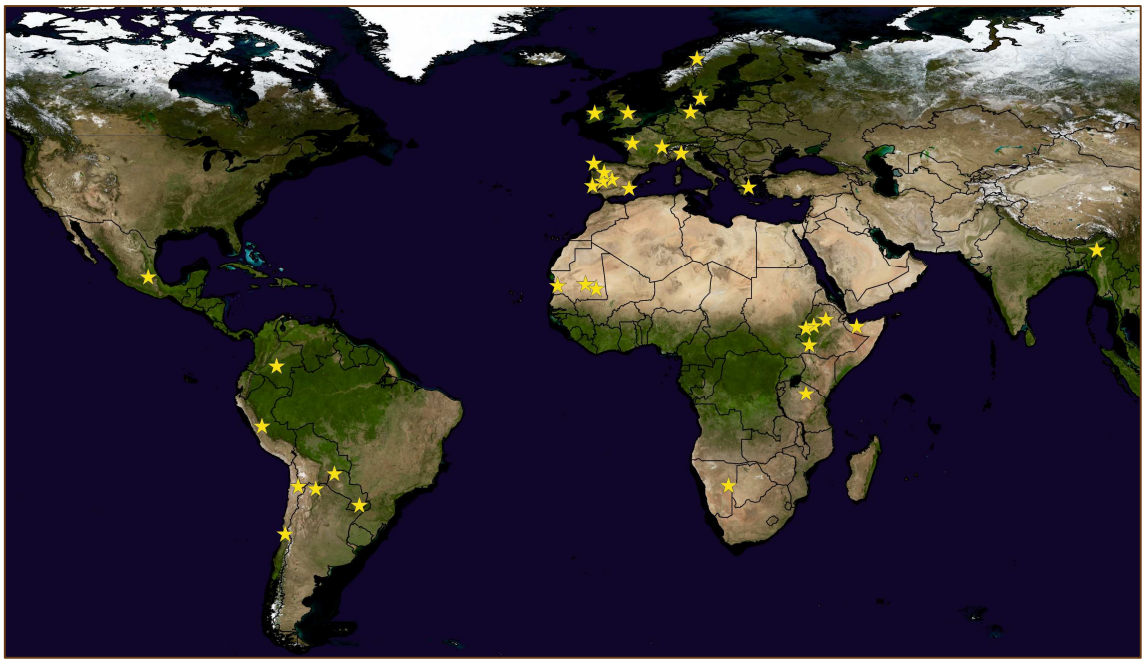
Material Minds (acronym XSCAPE) is a newly awarded ERC Synergy Grant project.

The project asks in what ways the worlds we build and inhabit alter our own minds and the ways we process information? Do the material structures of our settlements, buildings, roads, and artefacts change fundamental patterns of thought and attention, so that understanding change in these 'material codes' becomes part and parcel of understanding the emergence of the modern mind?

To answer these questions, the "Material Minds" Project brings together a unique team from archaeology, vision science, and cognitive philosophy. Using a carefully curated set of materials, spanning a range of cultures and a wide sweep of archaeological, historic, ethnoarchaeological and contemporary settings, we aim to test, for the first time, the hypothesis of materiality-driven cognitive change. "Materiality" here refers to *material culture*: human made *cultural artefacts* that include portable objects but also buildings, landscapes and ornamentations. The project will develop and deploy a new synergistic methodology that combines multiple real-world case studies with state-of-the-art visual neuroscience, and agent-based simulations.

We will conduct 41 different world-wide case studies. Together, these will constitute the largest ecological experiment on embodied visual perception ever attempted. The project will also use the emerging paradigm known as 'active inference' (or 'predictive processing') which offers a principled means of linking perception, attention, and actions (including eye-movements) with cognitive change and learning. This will provide multiple proofs-of-principle while delivering insights into the fundamental principles that may be guiding materiality-driven cognitive change.

Using this unique combination of archaeological materials, visual neuroscience, and simulation-based studies, we aim to deliver the first fully-integrated framework for understanding the potent yet ill-understood cycles by which we humans make and transform the structured worlds that make and transform our minds.

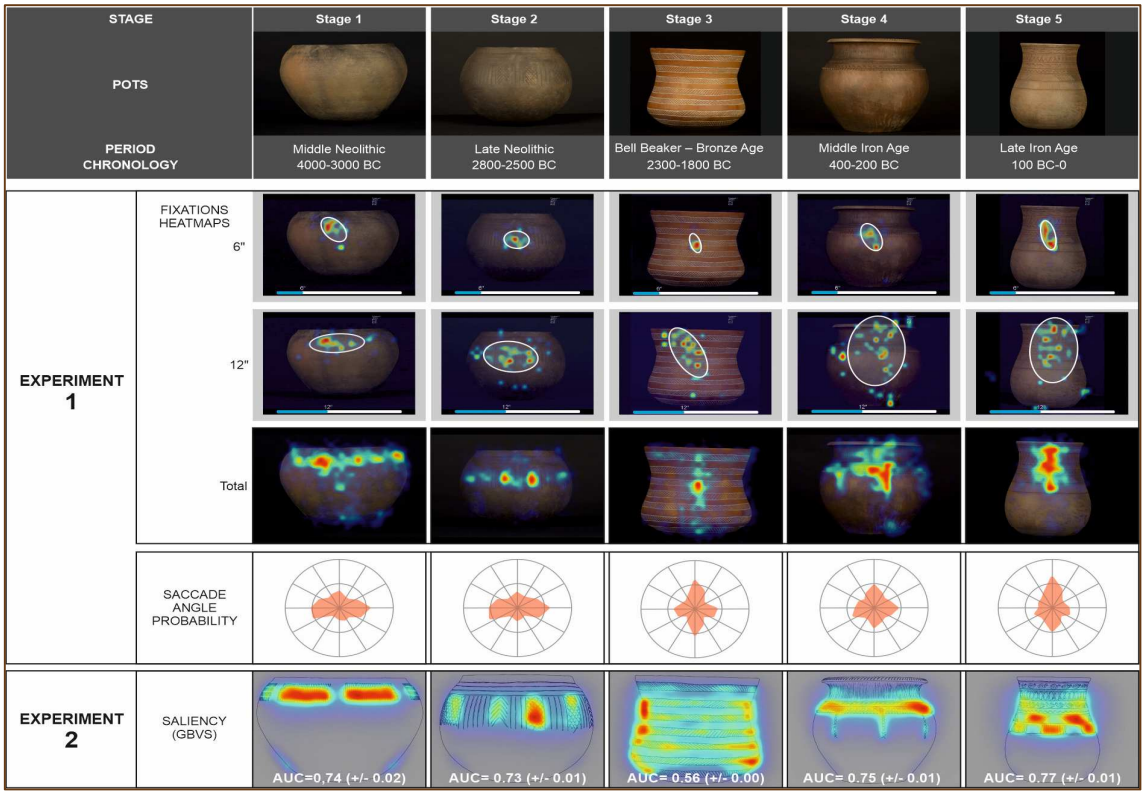


Do you wish to know more?

There are two pilot studies already available, that together give a sense of the core ideas, scope, and methodology. They are:

Criado-Boado, F., Alonso-Pablos, D., Blanco, M.J. … & Martínez, Luis M. Coevolution of visual behaviour, the material world and social complexity, depicted by the eye-tracking of archaeological objects in humans. Sci Rep 9, 3985 (2019). https://doi.org/10.1038/s41598-019-39661-w

Constant, A., Tschantz, A., Millidge, B., Criado-Boado, F., Martinez, L. M., Müller, J., & Clark, A. (2020, September 3). The Acquisition of Culturally Patterned Attention Styles under Active Inference. https://doi.org/10.31234/osf.io/rchaf



ERC's press release and the full list of winning projects

https://erc.europa.eu/news/erc-2020-synergy-grants-results

The Synergy Grant call

https://erc.europa.eu/funding/synergy-grants

The aim of the ERC Synergy Grant is to address ambitious research questions that can only be answered by the coordinated work of a small group of 2-4 Principal Investigators. RC Synergy Grants, applications must demonstrate that the proposed research **cannot be carried out by a single PI working alone**. Proposals are evaluated on the **sole criterion of scientific excellence** which, in the case the ERC Synergy Grants, takes on the additional meaning of **outstanding intrinsic synergetic effect**. The ultimate goal of the scheme is to support close collaborative interactions that will enable transformative research, which cross-fertilises research disciplines and is capable of yielding ground-breaking scientific results.

Synergy Grants can be up to a maximum of **€ 10 million** for a period of **6 years**.

The Synergy Grant 2020 call got over 430 proposals and 35 were selected to be funded by the ERC.

The Synergy Grants evaluation process goes through three different steps of international peer reviewing, involving the Synergy Grant Panel (formed from approximately 85 panel members and chairs), external evaluators, and an interview at the final stage. Panel Members are selected by the ERC Scientific Council on the basis of their scientific reputation.

The ERC (European Research Council)

https://erc.europa.eu/about-erc/mission

The European Research Council (ERC), set up by the European Union in 2007, is the premier European funding organisation for **excellent frontier research**.

The ERC's mission is to encourage the highest quality research in Europe through competitive funding and to support investigator-driven frontier research across all fields, on the basis of scientific excellence.

Today the distinction between 'basic' and 'applied' research has become blurred, due to the fact that emerging areas of science and technology often cover substantial elements of both. As a result, the term 'frontier research' was coined for ERC activities since they will be directed towards fundamental advances at and beyond the 'frontier' of knowledge

By challenging Europe's brightest minds, the ERC expects that its grants will help to bring about new and unpredictable scientific and technological discoveries - the kind that can form the basis of new industries, markets, and broader social innovations of the future. The ERC aims to make the European research base more prepared to respond to the needs of a knowledge-based society and provide Europe with the capabilities in frontier research necessary to meet global challenges.

By creating open and direct competition for funding between the very best researchers in Europe, the ERC will enhance aspirations and achievements. It will enable the best ideas and talents to be recognised from a larger pool than exists at national level.