POSTHUMAN FRONTIERS:
DATA, DESIGNERS, AND COGNITIVE MACHINES

Projects Catalog of the 36th Annual Conference of the Association for Computer Aided Design in Architecture
University of Michigan Taubman College of Architecture and Urban Planning, Ann Arbor

Edited by Kathy Velikov, Sandra Manninger, Matias del Campo, Sean Ahlquist, Geoffrey Thün
PROJECTS

acadia // 2016

POSTHUMAN FRONTIERS:
DATA, DESIGNERS, AND COGNITIVE MACHINES

Projects Catalog of the 36th Annual Conference of the Association for Computer Aided Design in Architecture

University of Michigan Taubman College of Architecture and Urban Planning, Ann Arbor

Edited by Kathy Velikov, Sandra Manninger, Matias del Campo, Sean Ahlquist, Geoffrey Thün

acadia
The rise of digital fabrication led by ‘digital artisans’ posits new technologies alongside traditional tools where we find the creation of “products of exceptional quality that retain the soul of the material and the skill of the human hand, while also benefitting from the precision, efficiency and increasingly unrestricted structural parameters of digital design and fabrication”. (Johnston)

As a way to explore the human and machine interaction, the research focuses on the hydraulic or encaustic cement tile as a point of departure. This revolutionary process for the production of tiles originated in the mid 19th century and was made popular through the rise of Modernismo, the Spanish version of Art Nouveau. The inlaid colorful geometric abstractions (mosaics) and the variety of embossed shapes (panots) allow for a wide range of nested geometries and depth that generate a formal field condition within the limitations of a surface. Panots & Mosaics, apparently different, share a common material: Portland cement compacted by a hydraulic press. A resurgence in the use of these tiles has sparked interest in resuscitating this almost forgotten art form. The objective of this exploration is not to recreate a construction material but to re-examine the physical properties and process of making as an opportunity to pursue new possibilities for fabrication and embedding alternative functions.
TOOLING
Tooling defined by Glenn Adamson is, “the making of the objects that go on to make other objects.” For this, we designed a dynamic formwork that would allow for a synthesis between the industrial process for making mosaics with our desire to freely modify their form digitally. The mold was controlled through Firefly and Arduino connected to ten stepper motors that allowed for the precise transfer of digitally modeled ruled surfaces to the geometry of the physical mold. Through this new tool our research established a parallelism between the industrial handmade method of the mosaic and a new digital version. By transforming the geometrically rigid mold into a dynamic digital version and by reducing the amount of material needed, we were able to modify the tiles scale and geometry while introducing a chromatic pattern into the cement.

INSTALLATION
This process led to the creation of a surface and re-examination of the physical properties of the material and its possible intersection with new approaches to making as an opportunity to explore alternative territories for fabrication and the reinvention of artisanship in the form of ‘digital hand-made’. The result was a vertical prototype composed of seventeen tiles with eight different geometries. The vertical solution was proposed to demonstrate that a heavy material like the hydraulic cement tile didn’t have to be as such. By using only the finish layer, the weight of the tile was reduced and the use of GFRC allowed us to increase the tile from an original size of 20x20 cm with a thickness of 2cm to a tile of 60x60 cm with a thickness of approximately 5mm.
5 Dynamic formwork, brass trepa and cement panel installation. (Morcillo Pallares, Rule, 2016)
CONCLUSIONS
Changes in the production of mosaics and other materials can be aligned with larger technological shifts; however, each transition seems to maintain that the resulting objects and materials are crafted expressions of human values as an extension of the mind through the hand, industrial machine or digital interface. This relationship became the catalyst for the subsequent experimental technique that hybridizes a local craft, mosaics, and a once prolific material, hydraulic cement tiles, with new trends in making through digital tooling.

The result has been the reinterpretation of a handmade process empowered by the digital, resulting in a familiar but new material. The hope is that this scenario of working through the reexamination of past methods of production, the handmade and the industrial, and their combination with new trends of digital production and tooling, will result in fomenting the juxtaposition of architecture, material science and programing that will allow us to challenge our expectations of form, aesthetic narrative and ultimately space.
ACKNOWLEDGEMENTS
Panots & Mosaics: the plasticity of hydraulic cement through making was made possible by a grant from the Taubman College of Architecture and Urban Planning at the University of Michigan.

The research would also like to acknowledge the participation and collaboration by the following students of Taubman College of Architecture and Urban Planning at the University of Michigan:

Timothy McDonough, Diemtrinh Tran and Kristen Gandy

REFERENCES


Jonathan Rule is an assistant professor of practice at the University of Michigan, Taubman College of Architecture and Urban Planning. He has been practicing architecture in Spain since 2008 and is a co-founder of the studio Morcillo Pallares + Rule Arquitectos. Rule received a Bachelor of Science in Architecture from the State University of New York at Buffalo, a Master in Architecture from the Harvard Graduate School of Design and a Professional Homologation from the Escuela Tecnica Superior de Arquitectura de Madrid.

Ana Morcillo Pallares is an assistant professor at the University of Michigan, Taubman College of Architecture and Urban Planning where she was the 2014-2015 Walter B. Sanders Fellow. Ana holds a PhD from the Escuela Tecnica Superior de Arquitectura de Madrid and a professional degree in architecture from the Escuela Tecnica Superior de Arquitectura de Valencia. She is a licensed architect in Spain where she has been a principal at Morcillo Pallares + Rule arquitectos since 2004.