The intersection of robotics, code and materials set up a stage for autonomous design systems that produce the ‘pericelly inexact’. Inexact could be understood as messy or formless – with emphasis on operation rather than stable definition. The inexact positions itself as an antithesis to the ‘anexact’ – the calculus spline based digital aesthetics proposed by Greg Lynn in his ‘Probable Geometries’ essay. The inexact looks to material agency as well as media translations to generate geometry in physical space. The ‘precisely inexact’ is geometry digitally generated with precise algorithms, translated with precise machines and is ultimately formed through the inexact behavior of rheological materials. The material is allowed to bubble, melt, droop and tear - behaviors instigated by the code and the machine. This geometry does not (and possibly can never) exist in the computer - it is radically physical.

Rheological Translations takes cue from the architectural technique of rustication, used to express radical materiality on the facades and surfaces of buildings. The design process adopted resin casting as physical medium for various geometric and robotic operations, leading up to a full-scale architectural proposal for a natural history museum. A rusti-
sketched digital geometry was first generated through image height-field operation on an exact primitive geometry (cube). It was then 3D printed and used as a mold for rotational casting of resin. We became fascinated with the dichotomy between the inside and the outside of the rotated cast. The outside faithfully reproduced the original 3D printed geometry with its triangulated mesh facets, extrusion layer striations and matte surface. The inside, on the other hand, began to distance itself from the original geometry. The surface became smooth and shiny, full of bubbles, drips and other unexpected and inexact geometries that began to suggest spatial qualities. (Figure 3) 6-axis robots were implemented to do the rotational casting for motion complexity and repeatability. (Figures 1 & 2) Successful casts were 3D scanned and their geometries and color maps were used to develop a digital model for the museum. (Figure 4)

The re-design of the Page Museum (adjacent to the Rancho La Brea Tar Pits on the LACMA campus in Los Angeles) explores the precisely inexact on an architectural scale. The design of the new museum addresses the peculiarities of the mediated ground plane on which it is located, reconsidering the ground as a site for the development of synthetic architectural systems by establishing a new datum or artificial ground. The concept for the museum follows the robotic processes of rotational resin casting, using material agency as driver for geometry (Figure 5). The building is an inverted primitive mass embedded in the ground. The idea of the plinth is inverted as well, where it acts as the roof for the building. The central courtyard is a heavily rusticated height-field serving as a garden. (Figure 8) The interior spaces ramp down and wrap around the courtyard. (Figure 7)
3 Material agency

4 Media translations: a) height-field geometry mesh; b) contouring for positive 3d print mold; c) positive resin cast; d) digitized cast scan

5 Unrolled elevation & section
NOTES


NIKITA TROUFANOV is a Los Angeles based designer currently pursuing a post-professional Master of Design Research degree at SCI-Arc (Southern California Institute of Architecture). Prior to SCI-Arc, Nikita worked in the offices of Adrian Smith & Gordon Gill in Chicago, Collective office in Chicago and Studio K3 in Los Angeles. He received his professional Bachelors of Architecture (BArch cum laude) from IIT (Illinois Institute of Technology).

BRENNEN HULLER is an M.Arch graduate and recipient of the AIA School Medal and the Certificate of Merit from (USF) The University of South Florida. Brennen is the co-founder of The Urban Conga which focuses on activating public space through interactive installations and has since won “The Deconstruction” international design competition. Currently, he is pursuing a post professional (MDesR) Master’s in design research at SCI-Arc’s Emerging Systems and Technological Media program.