

*your*HOUSE

yourHOUSE is a research and design project conducted by MIT's Design Lab that is breaking new ground as a pioneer in prefabricated home construction. With a thorough understanding of the past, an extensive utilization of new technologies of the present, and with an awareness of the possibility and growing need for low-cost and high-quality housing, yourHOUSE is set to change the future of home construction.



PROJECT OVERVIEW

The goal of the project is to exemplify a holistic design process which utilizes cutting-edge technologies and extensive research efforts with the intent to illustrate a system that allows prefabricated housing to be low-cost and yet high-quality. Essential for paradigm shift is to rethink the larger systems at work within the building and construction industry. Project yourHOUSE rethinks energy use through material efficiency and transportation reduction. Project yourHOUSE rethinks labor distribution through manufacturing processes and assembly sequencing. Project yourHOUSE addresses global concerns through local and relevant means.

Currently in the prefabricated housing industry there are two categories of houses. At one end of this spectrum there is the low-cost and low quality prefab house. The lack of quality quickly becomes evident in poor material selection and construction technique, as these houses are not only constructed of low-grade plastics and wood, but the houses in this category also lack any thoughtful consideration of grounded design principles and processes. Shortcomings like these stem from the absence of crucial components of housing innovation: cultural expression, the utilization of the great advancements in design software and hardware, and long-term grounded research.

At the other end of the spectrum lies the high-cost and high-quality prefab solution found in the numerous and trendy lifestyle magazines. While these can indeed claim to be pre-fabricated in their utilization of factory built parts with on-site assembly sequences, these houses are far from the reach of the average homebuyer. To

their credit and in result of their high-cost, these houses can be constructed with high-grade materials and a fine attention to assembly, all guided by a clear and thoughtful design process. What is missing from these houses though is a holistic understanding of the new and relevant tools available to architects that can allow for a streamlined process of design, detaching high-quality from high-cost.

yourHOUSE at the MOMA

The MIT Design Lab has been selected by the Museum of Modern Art to construct a full scale and functioning prototype of yourHOUSE for the 2008 museum show, "Home Delivery: Fabricating the Modern Dwelling." For this show, every component of the house will be entirely pre-fabricated offsite and delivered to the museum as a kit of parts which can be assembled in less than 2 weeks.

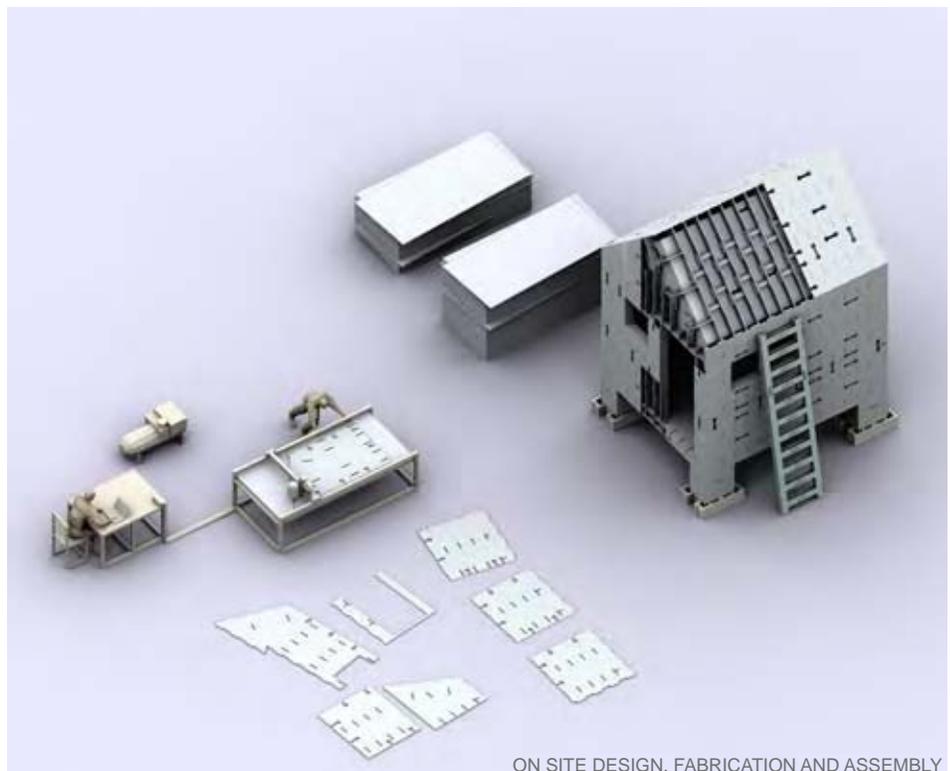
As part of the museum exhibition and in addition to the full scale production of the

house, there will be an interactive online exhibition which will have real-time video of the design and fabrication process.

According to the MoMA, "This exhibition will offer the most thorough examination of both the historical and contemporary significance of factory-produced architectures to date. With increasing concern about issues such as sustainability and the swelling global population, prefabrication has again taken center stage as a prime solution to a host of pressing needs."

yourHOUSE in NEW ORLEANS

After the completion of the MoMA show, yourHOUSE will be disassembled and trucked off site to be reassembled in New Orleans for permanent display. There will be virtually no waste produced by the process of fabrication, assembly and disassembly as every component will be re-used and re-assembled.



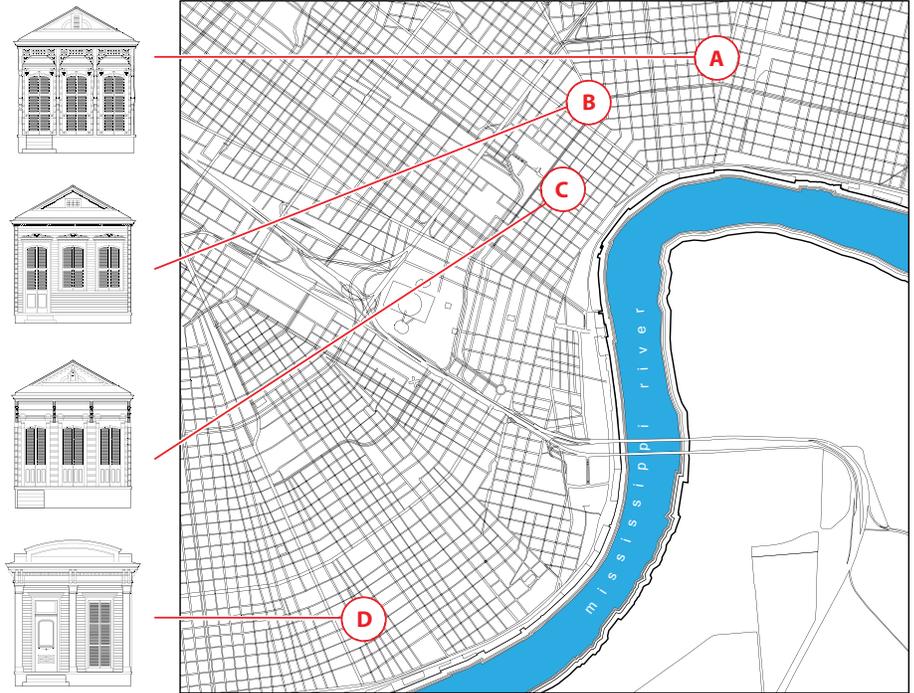
ON SITE DESIGN, FABRICATION AND ASSEMBLY



RESEARCH AND DEVELOPMENT

In the summer of 2007, the Design Lab conducted research on New Orleans 'Shotgun' housing. The research group met with local home-owners and documented houses throughout the city including houses in the Garden District, the French Quarter, Faubourg Marigny and the Lower Ninth Ward.

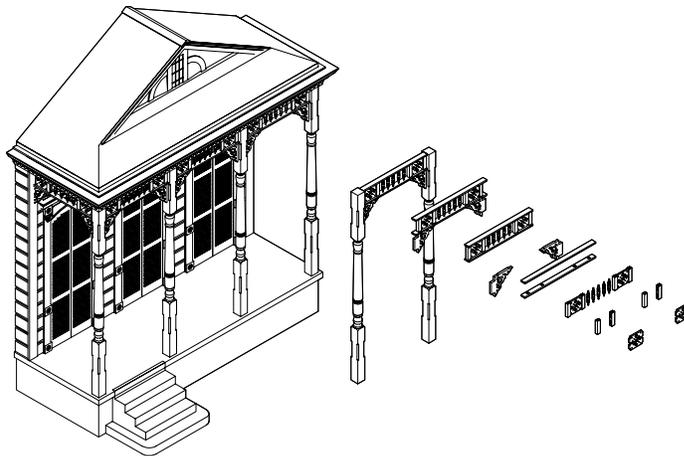
From this research and documentation, the Design Lab analyzed and digitally recreated these 'Shotgun' houses in order to understand local construction methods, traditional detailing and design aesthetics. From this understanding is where the translation into the yourHOUSE design took place. Through the digitalization and materialization process, which was developed at MIT by professor Larry Sass, the design, prototyping and fabrication of yourHOUSE has been made possible.



NEW ORLEANS RESEARCH SITES

DIGITALIZATION PROCESS

Digitalization is a 2-stage process which precedes a materialization process. First, 2-dimensional data was taken from the research documentation and was used to create elevation drawings. From this data, 3-dimensional building information was extrapolated and digitally modeled so that the house could be transformed into a solid physical model through a final materialization process.



ASSEMBLY LOGIC OF FACADE COMPONENTS

MATERIALIZATION PROCESS

Materialization begins by breaking down the digital model into an assembly logic of components and parts. Here, a physical language of geometric form was developed in order for every part to be precisely fabricated and assembled. In the middle figure is one such breakdown of a front porch column assembly.



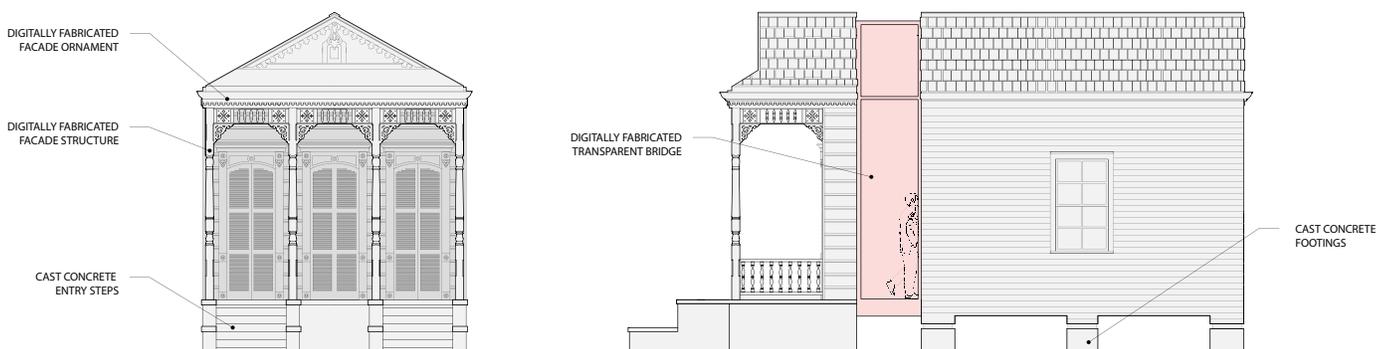
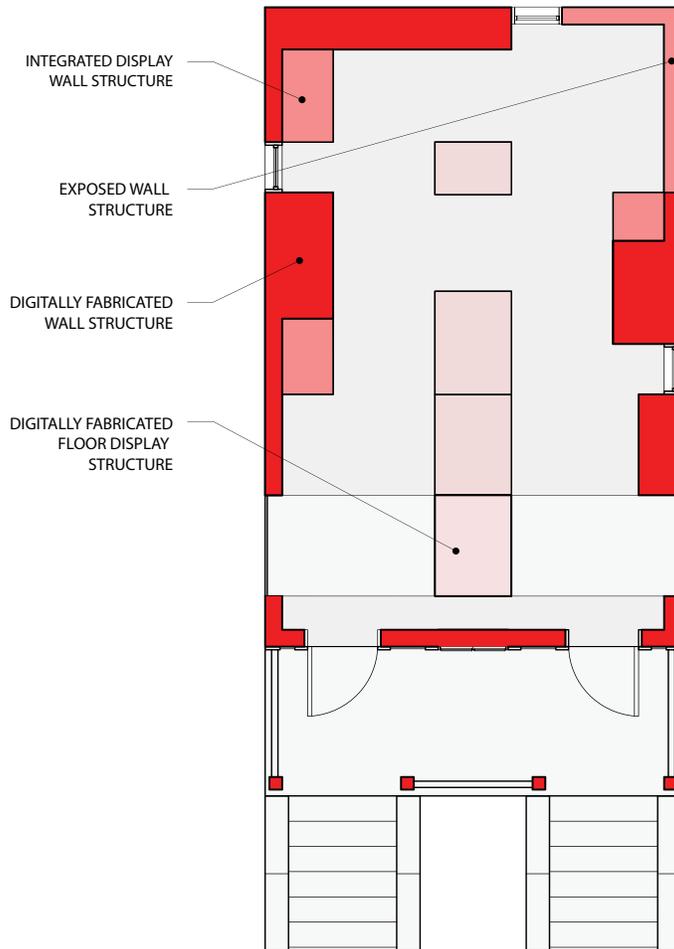
NEW ORLEANS RESEARCH HOUSES



PROJECT DESIGN

The yourHOUSE design for the MoMA exhibition is a reinterpretation of historical New Orleans style “Shotgun” Housing utilizing recycled plywood as the main construction material. It is a follow-up expanding upon a prototype house built at MIT in 2005. This house will be fabricated and assembled entirely of friction-fit components, completely eliminating the need for mechanical fasteners such as nails and screws. This fabrication technique is made possible through the extensive use of a computer numerical control (CNC) milling machine which not only automates and streamlines the process, but also allows for highly controlled working conditions.

For the museum show, the interior space will be for educational purposes. Integrated into the walls and floor systems will be displays that illustrate the processes used for the design, fabrication and assembly of the house. Part of this educational goal will include hands-on activities for the museum visitors to be able to interact with actual fabrication software and hardware.



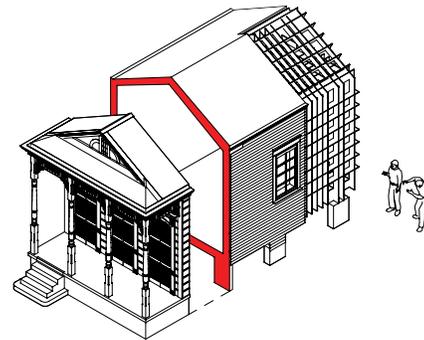
YOURHOUSE DESIGN SCHEMATIC



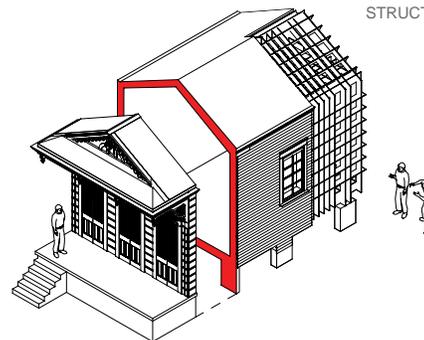
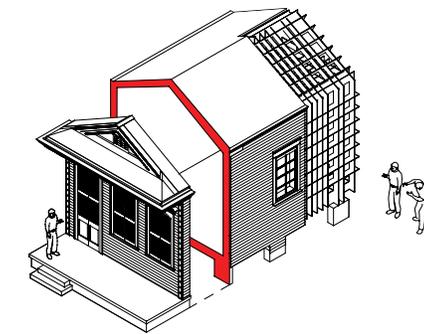
PROJECT CONCEPT:

INHABITANT-DRIVEN DESIGN

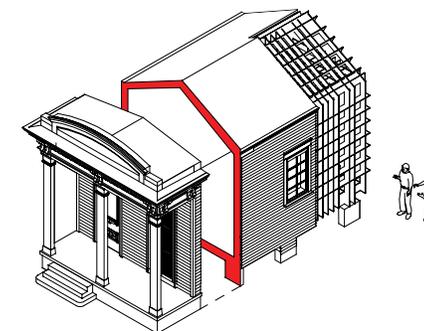
One of the core strategies driving project yourHOUSE is the use of mass-customized as well as mass-standardized components. This strategy happens at multiple scales ranging from details to major structural features. As seen in the figure to the right, the main body of the house employs a standardized structural shell while the front porch and facade can be customized to suit the unique context of each house.



USER-DESIGNED
FACADE



STANDARDIZED
STRUCTURAL SHELL



YOURHOUSE DESIGN CONCEPT

PROJECT TEAM

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CURRENT PROJECT SPONSORS

The Museum of Modern Art
The Rockefeller Foundation
ShopBot Tools, Inc.

PROJECT WEBSITE

<http://web.mit.edu/yourhouse/>