

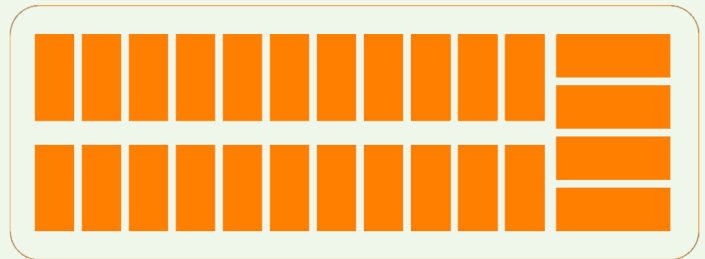
It Takes a Village: Modular Mass Timber and New Housing Imaginaries

Proposal for the 2023 ACSA Timber Education Prize
ARCH 4001 Undergraduate Senior Design Studio, Fall 2023
University of Cincinnati School of Architecture and Interior Design
De Peter Yi, Assistant Professor of Architecture



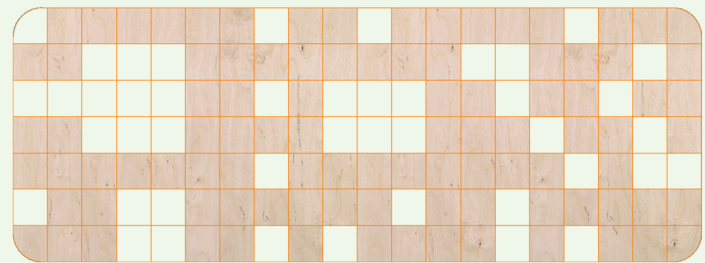
1. Urgency

Throughout history and across cultures, the use of timber has cultivated an intricate relationship with our living spaces. While modernist imaginaries embraced the new capabilities of concrete, steel, and glass, timber persists as the material that houses the masses, driven by the fine-tuned balance of standardization and customization in the light-frame house. Yet, the single-family house and its requisite culture of sprawl and consumption underlie our current climate predicament. Furthermore, the dream of attainable, quality housing for all has not materialized; exclusionary zoning practices mar its past and the shortage of affordable housing casts a pall on its future. Amidst new capabilities of building with wood through the mass timber movement, this course argues for a re-imagining of the social and environmental contracts of housing through the material that shapes it.



2. Potential

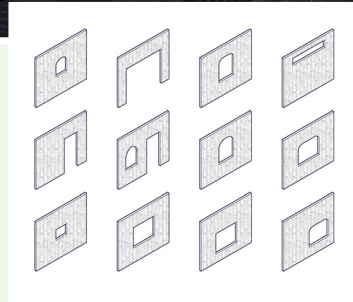
Mass timber, at once a prefabricated product, a low-carbon building structure, and a lightweight, workable material, is breathing new life into the modular housing project. Designing through modular construction brings together innovation at the site of manufacturing alongside the site of building, propelling partnerships across institutions, industry, and government driving change in the area of missing middle housing. Examples include a collaboration between nonprofit Forterra, architecture office Mithun, and structural engineering firm Aspect using volumetric modular units to create a cooperative housing project benefitting immigrant communities, as well as a collaboration between the University of Oregon and the City of Milwaukie using flat-packed modular panels to create much-needed workforce housing. Building on such work, this course positions modular mass timber as a bridge between a material project and a social project. Students will explore modular mass timber as the building blocks of housing “villages” that repair the broken social and environmental contracts of unfettered sprawl, with the goal of creating new housing imaginaries that are as desirable as they are attainable.



Above, the course seeks to transform a typical single family zoned residential block into a modular mass timber housing “village” that proposes new configurations of land and built structure. The design of this village is a way of directing the technical innovations of mass timber toward a socially and culturally impactful project.

3. Project

Restrictive and outdated approaches to land use has exacerbated the housing crisis. For example, in Los Angeles, close to 50% of these neighborhoods sit on land zoned for single family housing. Nearly 40% of that land cannot be built on due to setback restrictions. Recent policy innovation in zoning is changing this mindset with great potential to reshape the urban fabric. This includes the adoption of Senate Bill 9, which allows for the subdivision of a single family lot into two lots, each containing more than one unit. Acknowledging this growing movement of densification and the dire need for more affordable housing, the course identifies the prototypical single-family zoned block as a potent site for modular mass timber housing proposals. Our class will focus on residential lots in Cincinnati, Ohio, which recently became the first city in Ohio to legalize Accessory Dwelling Unit (ADU) construction. Students will research and propose designs for housing “villages” rooted in forward-thinking ideas of land use as well as nascent potentials of building with modular mass timber. We will probe how an equal focus on mass timber as a resourceful construction method and a building block for beautiful living spaces propel attainable housing from bare-bones solutions to enticing new forms of living together. In a similar way to how mass timber necessitates renewed attention to forest stewardship, our pursuit of better models of housing hinges on new ways of stewarding the finite resources of land and material.



A winning proposal in the 2021 LA Low Rise Competition for densifying Los Angeles lots using a flat-pack modular timber construction system. Images from 1+1+ Architects.

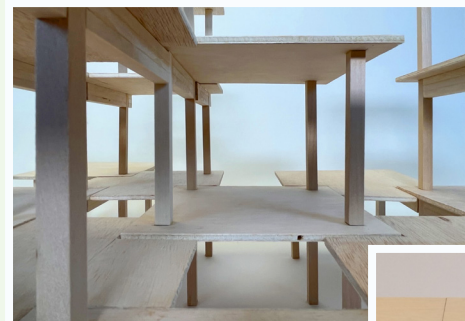
4. Method

Through cycling between research and making, the course will build a reciprocal relationship between modular mass timber and housing. From one end, students will research and design with knowledge from modular mass timber manufacturing to impact housing. These areas of investigation will include:

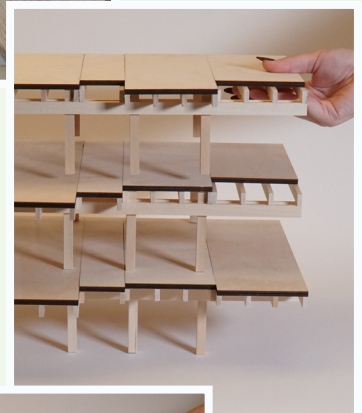
- A historic study of modularity in housing manufacturing and its relationship with the timber industry.
- A survey of current and emerging mass timber materials such as mass plywood panels that are capable of replacing light frame housing construction
- Finding opportunity in the delicate balance between standardization and customization in modular design.

From the other end, students will speculate on how our needs and wants of domestic spaces could push back on and inform the manufacturing-driven parameters of modular mass timber products through the following questions:

- Could the modular be a way to design for adaptability to the changes of day-to-day life?
- Could resourcefulness of material use align with a more sustainable approach to the sizes of our private spaces, while maintaining comfort?
- Could the natural material qualities of timber build empathy and understanding of our homes as made of finite resources?



The studio will foreground physical making and experimentation with timber modules. These images show student work from the ARCH 4001 Fall 2022 studio taught by the instructor that translated mass timber precedents into structural modules that can be aggregated as housing mass.



This part of the project will build on the nation-wide movement toward filling the gap of missing middle housing and re-densifying single-family zoned lots. Students will bring in knowledge not only from the implications of zoning policies that densify single-family lots, but also pre-existing housing models that provide alternative approaches to resource sharing, including community land trusts, cooperative housing, and single room occupancy housing.

5. Output

Acknowledging mass timber's retooling of the building as a scalable system, the outputs of the studio will be presented not only as project proposals, but also a mass timber housing design catalog. The catalog will balance digital research and representation with images of physical models that test the tectonic and spatial potential of different mass timber modular systems as they apply to housing. The catalog will be a tool to share our findings with architects, builders, and policy-makers with the goal of contributing new inputs to the trailblazing work being done in modular mass timber housing. At the same time, the catalog will seek to expand the imaginaries of what desirable and attainable housing could look like to a broader public. True to the title of the course, it takes a village to progress forward among the complex web of forces comprising the mass timber movement. Therefore, the conclusion of the course is seen as the continuation of a conversation, both within the field of architecture and beyond.

6. Work Plan

May 2023 - Instructor to attend 2023 Mass Timber Workshop at the Tall Wood Institute.

July – August 2023 – Instructor to conduct research in preparation for class, organize site visits, finalize research topics, reach out to contacts/guest speakers, and prepare full syllabus.

Late August 2023 – Course begins at the University of Cincinnati.

Early October 2023 – Class site visits.

December 2023 – Final reviews with invited guest reviewers with expertise in mass timber and housing.

December 2023 to January 2024 – Coursework to be formatted into a digital and print catalog.

January 2024 – Continue conversations with City of Cincinnati on possibilities for implementing studio outcomes into the city's housing initiatives.

7. Selected Readings and Sources

Aitchison, Mathew. *Prefab Housing and the Future of Building: Product to Process*. Lund Humphries, 2018.

Herbert, Gilbert. *The Dream of the Factory-Made House*. The MIT Press, 1984.

Ibanez, Daniel, Jane Hutton, and Kiel Moe. *Wood Urbanism: From the Molecular to the Territorial*. Actar Publishers, 2019.

Isaacs, Ken. *How to Build Your Own Living Structures*. Harmony Books, 1974.

Jones, Susan. *Mass Timber: Design and Research*. ORO Editions, 2018.

Luoni, Stephen. "Wood City: Timberizing the City's Building Blocks." *PLAN Journal: Research in Architecture and Urbanism* (2021): 337-360.

Oshima, Ken Tadashi, Rasmus Waern, Barry Bergdoll, and Peter Christensen. *Home Delivery: Fabricating the Modern Dwelling*. The Museum of Modern Art, 2008.

Putalik, Erin. "Endless Lamellae and Finer Grains: A Brief History of Better Wood." In *Blank: Speculations on CLT*, edited by Jennifer Bonner and Hanif Kara, 52-60. Applied Research & Design, 2022.

Schoenauer, Norbert, and Stanley Seeman. *The Court-Garden House*. McGill University Press, 1962.

TDI Mass Timber MeetUp: Modular Mass Timber Housing with Aspect and Mithun, organized by TallWood Design Institute, 2022.

TDI Mass Timber MeetUp: MPP Workforce Housing in Milwaukie OR, organized by TallWood Design Institute, 2022.