

Fiber Futures:

Plant-Based Materials and Low Carbon Construction for a Sustainable Built Environment

When: March 7, 2025, 1:00-6:00pm

Where: Rice School of Architecture, Farish Gallery

Symposium Sponsored by:
Rice Sustainability Institute
Conference and Workshop Development Award

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Rice School of Architecture Public Programs
Center for Environmental Studies

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Abstract

Year after year, COP's Global Status Report for Buildings and Construction states that the construction and operation of buildings accounts for approximately 40% of energy and process-related CO₂ emissions in the planet. This is in part because the construction industry relies on carbon-intense materials such as concrete, steel and plastics. Increasingly, there is a push to substitute these materials for plant-based ones, especially those sourced from fast-growing crops. Using plant-based materials means turning our buildings into carbon sinks, since the CO₂ absorbed by the growing vegetable fibers effectively becomes long-term carbon storage once placed inside a building envelope.

Mass timber structures or hempcrete thermal insulation are just two new applications garnering media attention worldwide, as part of a larger push to reform the construction industry towards decarbonization, a better use of resources, and a focus on human health. The speakers in this workshop are part of a young generation of architects and researchers who deftly combine pre-industrial, industrial and entirely new materials of their own invention. Together, they offer a panoramic view of the current attempts at reform of the construction industry and a hopeful image for a post-carbon built environment.

Symposium Format

This international workshop in the Spring semester 2025 brings together a small group of leading practitioners and researchers in the emerging field of plant-based and low-carbon construction design. Respondents from Rice Architecture and Environmental Studies, as well as the Office of Sustainability and the University Architect will engage the visitors in discussion. The audience will include Rice faculty, graduate and undergraduate students, as well as faculty and students from UH, and members of the local Architecture, Engineering and Construction (AEC) community. This format will allow to envision how the adoption of these emerging trends would look like in the specific case of the Rice campus and Houston region. The Symposium enhances the role of Rice as a leader on the space of sustainable construction. It is also intended to spur more of these experimental projects on campus and in Houston, and to help guide the University in the implementation of its sustainability goals.

Conveners

- Jesús Vassallo, Associate Professor, Rice School of Architecture
- Brett Schneider, Associate Professor, Rice School of Architecture

Speakers

- BLAF – Lokeren, Belgium (<http://www.blaf.be/>)
- Forstberg Ling – Malmö, Sweden (<https://www.forstbergling.com/>)
- Lopez Rivera Arquitectos, Barcelona, Spain (<https://lopez-rivera.com/>)
- Ultramoderne – Berkeley, US (<https://www.ultramoderne.net/>)

Respondents

- Richard Johnson, Director for Sustainability, Rice Office of Sustainability
- George Ristow, University Architect, Interim AVP of Construction, Planning, and Design
- Randal Hall, Interim Director, Center for Environmental Studies

Schedule

- 11:00 am Campus tour (for participants only)
- 12:0 pm Anderson Hall: Light lunch (for participants only)

- 1:00 pm Start of event – Introductory remarks
- 1:15 – 2:30 Talk by BLAF + Q&A
- 2:30 – 3:45 Talk by Ultramoderne + Q&A

- 3:45 – 4:00 Coffee Break

- 4:00 – 5:15 Talk by Forstberg Ling + Q&A
- 5:15 – 6:30 Talk by Lopez Rivera + Q&A
- 6:30 Closing Remarks and Happy Hour Reception

Lopez Rivera Arquitectos

Barcelona, Spain



BIO

Partners: Monica Rivera and Emiliano Lopez

Rivera and López are principals and co-founders of Emiliano López Mónica Rivera Arquitectos based in Barcelona, Spain. Their practice focuses on carefully crafted works that understand architecture as a cultural endeavor that is deeply engaged with the environment. Their work encompasses multiple scales and has received numerous international awards. Their work has been published in *El Croquis*, *Detail*, *Casabella*, *A+U Japan*, *Domus*, *Quaderns*, *Arquitectura Viva*, *Dwell*, and *The Architectural Review* among others. A monograph featuring their work, *Domestic Thresholds*, was published by Quart Verlag. They combine practice with teaching. Emiliano is Senior Lecturer and Mónica is Professor and Chair of Graduate Architecture in the College and Graduate School of Architecture & Urban Design in the Sam Fox of Design & Visual Arts at Washington University in St. Louis.

From top left: Passive House in Arteaga House, Cork Houses, Passive House in Arteaga, interior view.

Blaf Architecten

Lokeren, Belgium



From top left: Living area of the JTB residence, JTB house view from the yard, Visualisation of the wall composition.

BIO

Partners: Bart Vanden Driessche, Lieven Nijs

BLAF Architecten are best known for their long standing research on the performance of the wall section and its reinvention in tandem with new European energy standards and the use of natural materials. The research, which includes new uses for plant-fiber insulation and low ecologic impact brick, has been carried out through a series of experimental houses, referred to as the 'Big Brick Pilots', in which the architects aim to test a new type of brick and specific hybrid construction method with wood framing and hemp insulation. A 'Big Brick' is an unusually thick brick, which allows the outer shell of a house to be conceived as a completely self-supporting, structurally and thermally autonomous structure. This construction method offers advantages, including but not limited to thermal bridge control, error reduction, working conditions and heat transmission. This way the facade becomes an actual structure rather than the cladding of the building. BLAF thus offers resistance, and a potential alternative, to recent developments in brick applications under pressure from EPB, and the resulting modified meaning of façade design.

Ultramoderne

San Francisco, US



BIO

Partners: Yasmin Vobis and Aaron Forrest

Ultramoderne approach building systems, organization, and materials experimentally, in order to find new and more efficient ways to economically and sustainably reshape the built environment. Working both digitally and through physical models and full-scale mock-ups, they intensively research standardized and emergent construction systems to find new, better ways of making. This approach—simultaneously conceptual and pragmatic—not only leads to more responsive designs, but has made them a lead innovator in the use of new materials, particularly mass timber technologies such as CLT, as a sustainable replacement for steel and concrete. The office has received awards from the Architectural League, Architect Magazine, Domus Magazine, the Chicago Architecture Biennial, the American Academy in Rome, the American Institute of Architects, and others. Clients include: the Van Alen Institute, the National Parks Service, Chicago Parks District, the Museum of Modern Art, the Architectural League of New York, and the Boston Society of Architects. Additionally, both partners are currently assistant professors at UC Berkeley.

From top left: Living area of the JTB residence, JTB house view from the yard, Visualisation of the wall composition.

Forstberg Ling

Malmö, Sweden



BIO

Partners: Björn Förstberg and Mikael Ling

Förstberg Ling was founded in 2015 by Björn Förstberg and Mikael Ling. The studio's approach to architecture and design is rooted in understanding the assignment at hand and at the same time challenging conventions. This approach has resulted in a re-valuation of traditional scandinavian construction techniques, bringing them to bear into contemporary passive and low embodied carbon ambitions. Förstberg Ling believes that creativity and innovation occur at the intersection of deep know-how and critical questioning. Förstberg Ling does not dismiss the known, but by pushing its boundaries and integrating elements of the novel, their work often treads the line between the obvious and the unexpected. While drawings, sketches, and images are crucial for guiding the process, they are not the end goal. The ultimate value and significance lie in the tangible, real-world implementation or construction. Drawings are instructions; the built object is everything. For their project Twelve Houses, Förstberg Ling took on the roles of architect, developer, and main contractor. The project was completed in 2022 and was nominated for the Kasper Salin Prize the same year. It won the 'Bostadspriset' in 2023, awarded by CBA to the best newly constructed residential project in Sweden for that year.

From top left: House with a Hidden Atrium, Three Houses, House for Two Artists