This studio immerses students into digital workflows for AEC collaborative design, simulation and fabrication of timber structures. Working in an integrated design team, students will learn how technology is shaping Materials (engineered wood products), Design (parametric modeling and virtual testing), and Construction (manufacturing and assembly). Co-taught with Oregon State University (OSU) Associate Professor Dr. Mariapaola Riggio, an architect and structural engineer who specializes in timber, this studio provides a unique chance to partner with OSU students from fields such as Wood Science, Civil Engineering and Construction Management.

This year’s project will focus on Design for Change and the Circular Economy. Given dimensions of recycled panels and factory off-cuts, students will design a modular spatial system of rooms and canopies so that clusters can expand, or be disassembled to shift or be repurposed. The challenge is to:

- Minimize waste and maximize flexible use of components in the current project
- Maximize future material reuse by minimizing cuts and standardizing dimensions
- Maximize the spanning ability of small pieces in reciprocal frame canopies

Students will be coached in parametric design and structural analysis to support creating and evaluating digital design variations. With partners, students will learn about connection types, and physically prototype connections for disassembly and re-use. Then students will work in interdisciplinary teams to develop assemblies, with UO students designing connecting rooms, canopies, clusters and site adaptations. The class will select from the best ideas to create a large-scale mock-up.

From taking this course students will

- Learn how to design and analyze parametric variations of timber structures
- Practice integrated AEC collaboration, visualize and experience construction processes.
- Learn design implications of how wood can be engineered, manufactured and assembled
Hybrid Format
This studio supports a creative, iterative process, bringing together a group with diverse skill sets. Expect to spend a lot of time working with your small group (including 6 hours per week with OSU partners) as well as independently accessing online materials. During the term, class activities will build on each other. You will be developing and testing your ideas, applying new knowledge, sharpening your skills, and receiving continuous, personal feedback on your work from the instructors and external reviewers. Learning will occur through:

- Lectures on structural principles and timber construction methods with quizzes
- Case studies: examine how principles and techniques were used in classic & contemporary structures.
- Software tutorials
- Woodshop demonstrations
- Design speculations using principles, examples, software and woodshop methods.
- Reflective writing of forum questions and work-in-progress reports

Students are expected to be available MWF 1:00-4:50pm for class sessions, there will be some flexibility for shifting work time to accommodate woodshop and partner availability. **We will take two trips to OSU: the 1st is tentatively Friday, Sept 30 to meet partners and tour facilities, the 2nd will be at the end of the term.**

**Schedule**

| Weeks 1-4 | - Build knowledge about timber products, reciprocal frame structures & design for disassembly (through lectures, discussions, quizzes, case study research) |
| | - Build parametric design and structural analysis skills (through tutorials & digital experiments) |
| | - Build material and connection understanding (through hands-on woodshop construction of small prototypes) |
| Weeks 5-7 | - Develop design collaboration abilities through a small group project by applying skills and knowledge from weeks 1-4. |
| Weeks 8-11 | - Deepen understanding by refining and producing a large-scale structure |

**Measurable Student Learning Outcomes**

1. Describe various types of timber structural systems, their behavior and use in contemporary practice
2. Design and analyze parametric variations of these structural systems
3. Understand the design implications of how wood materials can be engineered, manufactured and assembled
4. Develop structural solutions to support architectural design
5. Develop fabrication solutions to support architectural design
6. Collaborate in an integrated design team
7. Document design solutions, visualize construction processes and communicate to different audiences

See [http://timbertectonics.com](http://timbertectonics.com) for more information.