

## **PHD position: Systems analysis of scaling wood construction**

### **Your mission:**

**The Scaling Wood Construction project:** ETH Zurich, Empa, WSL, and EPF Lausanne <https://ibois.epfl.ch/> are launching an interdisciplinary research project to provide the scientific basis to leverage the transition to a construction bioeconomy across the wood supply chain in Switzerland, set within European and global contexts. Drawing on the expertise of the four ETH Domain institutions, the research will encompass forest dynamics and production under climate change, scenarios of material use and flows, new construction materials, development of new design and AI approaches to maximise resource use efficiencies, life cycle assessment evaluating impacts on carbon emissions and biodiversity, and costing models. The project aims to identify key leverage points in the value chain to scale wood construction and to deliver environmentally optimal Swiss wood use scenarios. We will apply environmental, economic, technical, societal, and political research across the wood value chain to construct the inter-dependent systems understanding that is required for transformative change across the wood construction supply chain. The diverse array of expertise across the four research institutions will be further informed by private sector and NGO partners, enabling us to collectively explore options for contributing to net-zero carbon by transitioning to mass timber construction.

### **Main duties and responsibilities include:**

**The project for which this position is offered constitutes WP3 in the Scaling Wood Construction consortium.**

Topics to be worked on include:

- Optimised use of locally grown and processed timber towards architectural realizations
- Scanned resource data from forest defining incoming library of trees as available construction material
- Linking the library of trees to a specific architectural realization
- Carbon balance of the proposed supply chain and its legal assessment established

You will be expected to:

Lead the development and further iteration of a scan flow for the Scaling Wood Construction project, and the development of a systems models by which to explore intervention options (and ramifications) for enabling a socio-technical transition towards mainstreaming wood in construction. Work closely with all academic partners across the project and draw on the outputs from other work packages.

Engage with practitioners across the value chain in Switzerland, from forest managers to the wood processing industry, architects, the construction sector, and policymakers to better understand opportunities, constraints, and challenges for transitioning to wood construction at all these levels. This will require conducting interviews and participating in, or leading and facilitating, workshops and meetings (many of which will be in German and/or French).

Apply and validate the scan flow to case studies in Switzerland and Europe (in collaboration with our external partners).

Deliver academic outputs, which should include peer-reviewed publications of the systems dynamics model and analyses of alternative scenarios of change towards a wood construction bioeconomy. The systems dynamics model should therefore also be set in the context of socio-technical transition theory.

Participate in project meetings and seminars and communicate outputs in Swiss and international academic and practitioner conferences.

**Your profile:**

- Master in a relevant forest or timber science topic (e.g., forest management, wood construction systems, timber characterization)
- Experience in scan technologies
- Experience in working with, and modelling, complex robotic and cnc workflows
- Interviewing and workshop facilitation skills.
- Ability to work across multiple disciplines, including excellent skills in synthesizing quantitative and qualitative information.
- Fluency in French and English (knowledge of German would also be highly advantageous).
- Ability to work independently, and with strong organizational skills to work across project partners in different institutions.

**Advantageous:**

- Experience of Robotics in Timber construction
- Understanding of forest management, Life Cycle Assessment, Agent-Based Modelling, or wood construction processes and robotic applications
- Prior experience in the wood construction value chain in Switzerland and/or Europe.

**We offer:**

The PHD Student will be based within the IBois Laboratory at EPFL in Lausanne. We offer to work on unique environment where creativity meets the field of architecture and specific contemporary architectural approaches. The Laboratory is a hub for collaborations on innovative projects. The candidate will benefit from this collaborative, dynamic and enthusiastic working environment.

The position comes with a competitive salary. The PHD Student will be supervised by Professor Yves Weinand of the IBois Laboratory.

**Start date:** Latest by 1<sup>st</sup> February 2023.

Deadline for the application 1<sup>st</sup> December 2022.

**Term of employment:** Fixed-term (CDD)

**Work rate:** 100%

**Duration:** 1 year, renewable.

**Contact:** [lara.dubois@epfl.ch](mailto:lara.dubois@epfl.ch)

Applications should include (i) the CV, (ii) a motivation letter and (iii) two contacts for reference letters. A short data science portfolio is welcome. Qualified female candidate are encouraged to apply.