

Reconciling Additive Manufacturing, Robotic Assembly and Limit Analysis for Sustainable Constructions

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Additive manufacturing and robotic assembly allow using naturally grown structural elements in combination with 3D printed components, limiting the use of steel and glued elements, aiming to foster a more sustainable building culture. However, from a structural perspective, the use of non-standard solutions introduces new uncertainties and challenges in relation to the design and analysis of the global load-bearing behavior of structures, as well as their connection systems. In this context, methods based on limit analysis are particularly effective since they are not restricted to a specific structural typology, material, or scale. The seminar will illustrate the application of limit analysis-based methods such as strut-and-tie modeling and graphic statics to the structural design and analysis of two full-scale demonstrators: the Digital Bamboo and the CantiBox.



Davide Tanadini is a lecturer and PhD student at the Chair of Structural Design led by Prof. Dr. Schwartz at ETH Zurich. His research focuses on possible applications of limit analysis and graphic statics on timber structures and timber joints, and their implementation in digital fabrication and robotic assembly. Davide graduated from ETH Zurich as a civil engineer in January 2018.



The Digital Bamboo at the *Biennale Architettura: Time, Space, Existence* exhibition in Venice in 2021.



The CantiBox under construction at the *Robotic Fabrication Lab* at ETH Zurich in 2022.