



# CAS ETH in Regenerative Materials

Earth, bio-based, reused

# Think regenerative !

It is time to go beyond sustainability.

Construction industry consumes a tremendous amount of resources and is responsible for half of the greenhouse gas emissions and waste released from our societies. In the last decades, diverse solutions have been provided in order to align building technologies with current sustainability standards. However, despite these efforts, being less bad is simply not good enough and a shift towards a regenerative approach, which provides more positive benefits is then urgently needed.

Alternative solutions out of earth, bio-based and reused materials are emerging all over the world and are triggering regenerative output, thanks to their capacity to contribute to the restoration and improvement of the surrounding natural and social environment. However, they are not widespread in the construction sector due to lack of information on the side of decision makers and lack of competence on the side of practitioners.

This new CAS gives the professionals the opportunity to acquire these skills.

Cover picture: Ricola  
Kräuterzentrum / Arch:  
Herzog & de Meuron  
Photo credit: Iwan Baan

page 3: Centre of discovery  
of the biodiversity,  
Beautour, La Roche-sur-  
Yon, France Architecte:  
Guinée\*Potin

Photo credit: Sergio  
Garzia



# Objectives

This continuing education program aims to give practitioners tools and methods to use earth, bio-based and reused materials with efficiency and creativity in order to contribute to the necessary ecological and social transition in the construction sector.

We propose a Certificate of advanced studies (CAS) for the management of projects to strengthen construction knowledge with these «low-carbon» building materials. With this programme we ambition to:

- Participate to the necessary ecological and social transition in the construction sector,
- Train specialists to conduct complex projects using earth, bio-based and reused materials with realistic and affordable solutions,
- Highlight exemplary architectural projects developing circular economy and the use of «low carbon» materials,
- Offer a practical experience on real projects (new construction, thermal renovation, historic restoration),
- Create a network of professionals working on regenerative construction.

## Target audience

Project managers, members of city technical services, building contractors, NGOs, architects, engineers.

12-16 participants from Switzerland and abroad. 12 credits, 5 weeks distributed over 1 semester (theoretical blocks and practical modules + individual project exercise).

## ETH teaching board

Prof Dr Guillaume Habert

Prof Dr Andrea Frangi

Dr Sophie Claude

Daria Ardant, Dr Coralie Brumaud

Giulia Celentano, Yi Du

Dr Francesco Pittau, Vera Voney

Dr Michael Klippel

Ken de Cooman, BC architects (Belgium)

Prof Dr Corentin Fivet, EPFL (Switzerland)

Dr Rodrigo Fernandez, Terrabloc (Switzerland)

Laetitia Fontaine, amàco (France)

Dominique Gauzin Müller, UNESCO earth (Germany)

Renaud Haerlingen, Rotor (Belgium)

Dr Valentina Marincioni, UCL (UK)

Vincent Pierré, Terranergie (France)

Martin Rauch, Lehm Ton Erde (Austria)

Eike Roswag, TU Berlin (Germany)

Werner Schmidt (Switzerland)

Dr Christof Ziegert, ZRS (Germany)

## International teaching board

Dr Romain Anger, amàco (France)

Roger Boltshauser (Switzerland)



Hands-on during the module 1 of the CAS 2020.  
Photo credit: Giulia Celentano.

### Duration

Starting in January 2021  
12 credits, 5 weeks distributed over 1 semester  
(theoretical and practical modules + individual project exercise)

### Language of instruction

Courses are typically held in English. Visits and discussion with practitioners will be translated in English but given sometimes in French, German or Italian.

### Tuition fees

CHF 7,000  
It does not include living expenses.

### Infrastructure

Students are enrolled at ETH Zurich and are entitled to the use of all academic facilities, including student computer rooms, excellent libraries with electronic access to journals, discounted meals in

student cafeterias, as well as access to sport and leisure facilities.

### Application

Applicants are asked to apply online and also include a motivation letter, a CV and two reference letters.

Application deadline: October 20th, 2020.

The Ricola Foundation supported the creation of the CAS and is covering the admission fees of three participants with financial difficulties.

### For more information on the CAS

<https://sc.ibi.ethz.ch/en/education/cas-regenerative-materials.html>



# Pedagogical approach

An active learning placing the student at the centre of the training is settled here with participative methods, experimental lectures, hands-on exercises, inspiring visits and project-based learning.

The CAS programme explains how to achieve a project with non conventional materials in the Western world as well as in emerging and developing countries. It covers ecological aspects (environmental footprint, carbon storage), regulations (thermal, hygrothermal, fire resistance, seismic safety), evaluation of the costs, social aspects (communication, empowerment of the population, training of craftsmen).

Diverse modules dealing with practical issues are offered.

The «Inspiration modules» propose public input lectures from well-known specialists (e.g Christof Zieger, Renaud Haerlingen, Dominique Gauzin-Müller) to raise public



awareness. The visit of inspiring buildings and construction sites (e.g. those realised by Martin Rauch) will allow discussion with stakeholders involved in their realisation.

The «Practical modules» gather real-life experiences that can prepare the students to apply their knowledge. They include hands-on workshops to understand the materials, technical experiments to test the different ways of building with earth, bio-based and reused materials as well as group projects to work on realistic calls for tenders.

Training is structured along five main modules split in five weeks: four weeks with contact hours and an individual project exercise.

Visit and hands-on during the module 2 of the CAS 2020.  
Photo credit: Giulia Celentano.

### **Module 1 : Discovering Regenerative Materials**

**Week 1 18.01-22.01.21**

- Discovery (composition, implementation, LCA analysis, aesthetic)
- Inspiration from vernacular and contemporary architecture: think local - adopt a territory approach
- Social and ecological transition through Regenerative Materials
- Innovative project setting up to overcome legislative barriers

### **Module 2 : Earth construction**

**Week 2 01.03-05.03.21**

- Construction techniques
- Focus on the structural behaviour and durability
- Cost and planning, existing standards
- Innovative processes: Prefabrication and production line

### **Module 3 : Bio-based construction**

**Week 3 12.04-16.04.21**

- Construction techniques
- Focus on the thermal and hygrothermal behaviour
- Cost and planning, existing standards
- Recent development with lightweight materials

### **Module 4 : Re-valuing the building stock**

**Week 4 17.05-21.05.21**

- Methodology for energy retrofit of existing buildings (historic to 80's)
- Refurbishment technique with Regenerative Materials
- Advantages of RM as finishing (air quality, acoustic, moisture regulation)
- Deconstruction: from dismantling to reuse
- Re-think modern building conception for future reuse

### **Module 5 : Individual project exercise**

**Week 5 14.06-18.06.21**

- Analysis of the local resources, the regional know-how and the social challenges of the project to tend towards a regenerative architecture
- Definition of a pre-programme with cost and planning
- Formulation of a strategy to overcome blockages

ETH Zürich  
Institute of Construction and Infrastructure  
Management  
Chair of Sustainable Construction  
Stefano-Frascini-Platz 5  
8093 Zurich

Prof Dr Guillaume Habert  
Dr Sophie Claude

[sclaude@ethz.ch](mailto:sclaude@ethz.ch)

