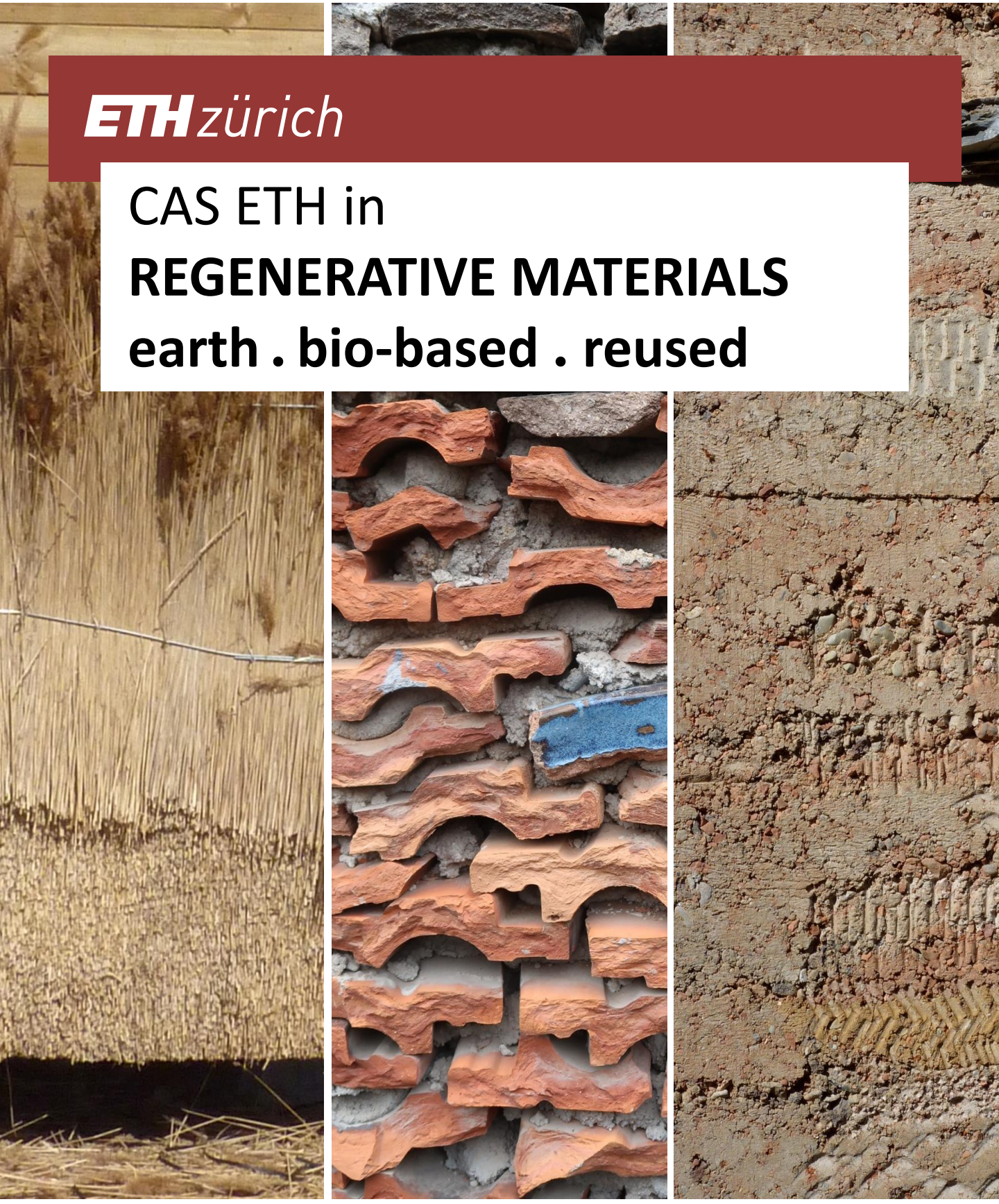


ETH zürich

CAS ETH in
REGENERATIVE MATERIALS
earth . bio-based . reused

D-BAUG

IG lehm

ETH sustainable construction
Swiss Federal Institute of Technology Zurich

CONTEXT

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 from decision makers and lack of competence from practitioners.

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

House Rauch in Schlins, Austria.
Design: Roger Boltshauser and Martin Rauch

OBJECTIVES

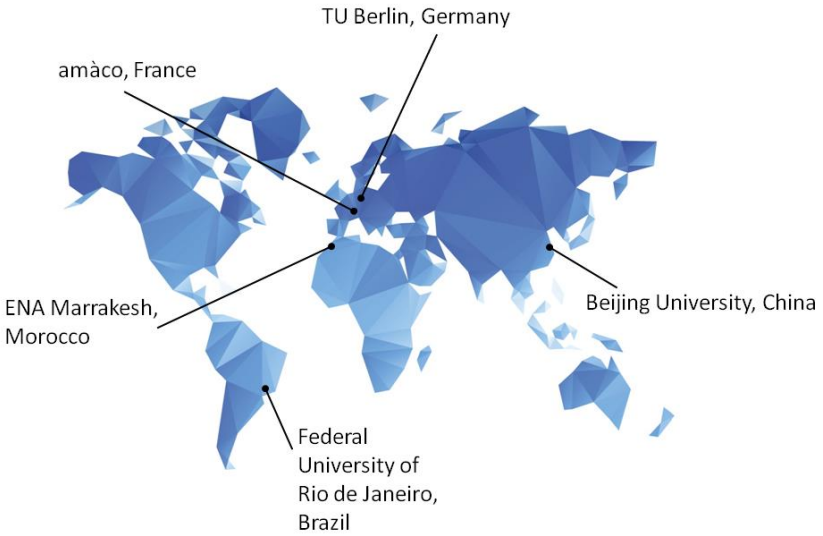
This education program aims to give practitioners tools and methods to use earth, bio-based and reused materials with efficiency and creativity in order to contribute to the necessary ecological and social transition in the construction sector. We propose a **Certificate of advanced studies (CAS)** for the management of projects to strengthen construction knowledge with these "low-carbon" building materials. With this program 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…
10-15 Students from Switzerland and abroad. 12 credits, 5 weeks distributed over 1 semester (theoretical blocks and practical modules + individual project exercise)

INTERNATIONAL PARTNERS AND TEACHING BOARD



CAS & MAS coordination
Chair of sustainable construction, ETH Zurich
Prof. Guillaume Habert
Dr. Sophie Claude

ETH teaching board
Roger Boltshauser
Sophie Claude
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Andrea Frangi

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Dominique Gauzin-Müller, UNESCO-earth chair (Germany)
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Mu Jun, Beijing university (China)
Martin Rauch, Lehm Ton Erde (Austria)
Eike Roswag, TU Berlin (Germany)
Abdelghani Tayyibi, ENA Marrakesh (Morocco)
Romildo Toledo Filho, UFRJ (Brazil)

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-course 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...). Taught skills enable to manage new construction projects but also energy retrofit and heritage conservation projects.

Diverse modules dealing with practical issues are offered:
- The **«Inspiration modules»** propose public **input lectures from well-known specialists** *(e.g. Wang Shu, Anna Heringer, Simón Veléz...)* 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.

Certificate of Advanced Studies in Regenerative Materials (12 ECTS)

Module 1 : Discovering Regenerative Materials — Week 1

- 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

- 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

- 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

- 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

- 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-program with cost and planning
- Formulation of a strategy to overcome blockages

CONTACT

CAS ETH in Regenerative Materials

Chair of sustainable construction,
ETH Zurich
Prof. Guillaume Habert
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Duration

Starting in January 2020

12 credits, 5 weeks distributed over 1 semester (theoretical and practical modules + individual project)

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

CAS: 7'000 CHF

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.

Living in Zurich

Zurich is a fantastic city, offering a high quality of life and diverse recreational and cultural activities. Its proximity to lakes and mountains makes Zurich an especially attractive place to live. The city has an international metropolitan flair.

Application

Applicants are asked to send a motivation letter, a CV and 2 references.

Application deadline: November 20th, 2019.