

M3

08.04 - 12.04.2024

M3 BIO- BASED CONSTRUCTION

CAS ETH in Regenerative Materials - ESSENTIALS

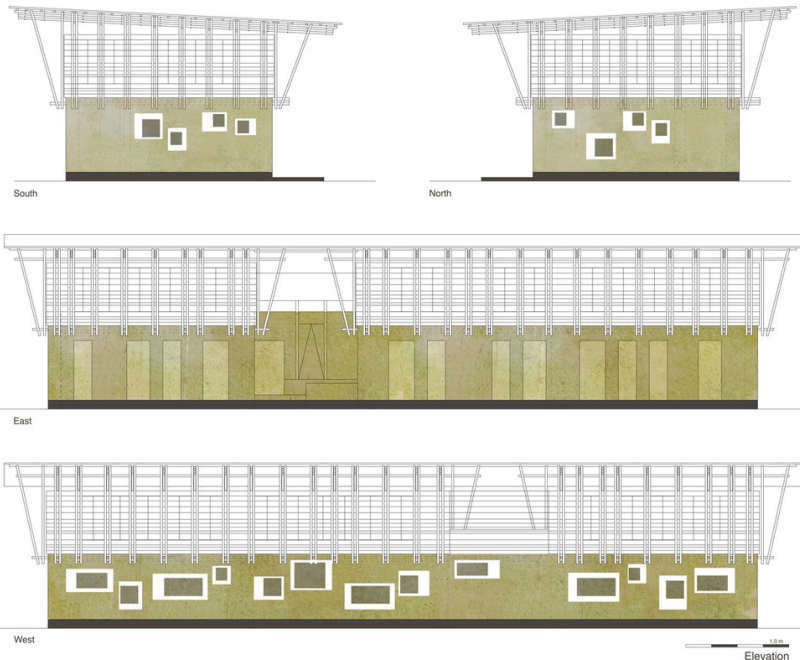
earth - bio-based - reused
08.04 - 12.04.2024

EIKE ROSWAG



One of the initiators and directors of ZRS Architekten Ingenieure Berlin and chair of the Natural Building Lab at TU Berlin, for more than 20 years, Eike Roswag has been researching climate and resource adaptive, human architecture in different climatic zones, which forms the basis for his teaching, design and construction projects.

His projects demonstrate a great variety and range from schools out of earth and bamboo in the global south, over heritage rehabilitation project in the Middle East and Europe up to housing, production buildings and schools out of timber, earth and natural fibre insulation in Europe.



METI School by Anna Heringer & Eike Roswag
Photo credits: © Anna Heringer & Eike Roswag

Monday

08.04.2024

09h00 - 09h30

HIT F 12

INTRODUCTION

Arnaud EVRARD / ETH Chair of Sustainable Construction

- Introduction to the week's program

09h30 - 10h30

HIT F 12

BIO-BASED RENOVATION OF LARGE BUILDING STOCKS

Verena GÖSWEIN / ETH Chair of Sustainable Construction

ethz.zoom.us/j/69887868609

- Modelling building stocks to comply with 2°C carbon budget?
- Land requirements for large-scale use of bio-based materials
- Prospective strategies and evolution scenario

10h30 - 12h30

HIT F 12

TRANSFORMING NATURAL BUILDING TRADITION

Eike ROSWAG / ZRS Architekten Ingenieure

ethz.zoom.us/j/69887868609

- Natural Building LAB – TUBerlin
- EU Research Project H-House
- Resource Adaptation in Europe
- International projects using Natural Building Methods

13h30 - 15h30

HIT F 12

DYNAMIC LCA

Guillaume HABERT / ETH Chair of Sustainable Construction

- Methodology of LCA
- Why dynamic LCA?
- Carbon Balance

15h30 - 17h30

HIT F 12

EXERCISE DYNAMIC LCA

Yasmine PRIORE / ETH Chair of Sustainable Construction



Überbauung Bombasei
Atelier SCHMIDT GmbH
Photo Credit: © Damian Poffet

Tuesday 09.04.2024

PRIVATE BUS from ETH HÖNGGERBERG

Busparking (beside Coop in front of HPT)

Meeting: 07:30

Departure: 07:45

Arrival: 09:00

Werner Schmidt (Atelier Werner Schmidt) will accompany us the whole day.

PRIVATE BUS

Departure: 10:00

Arrival: 10:30

PRIVATE BUS

Departure: 11:30

Arrival: 12:00

LUNCH
BREAK

PRIVATE BUS to ETH HÖNGGERBERG

Departure: 14:00

Arrival: 15:15

09h00 - 10h00

HAUS HONSBERGER

Kleinholz 5, 3378 Graben

Host: Pierre HONSBERGER (Owner)

- Strawbale house with wood structure
- Super insulated + autonomous (energy from PV)
- Combination of traditional building techniques and modern technology

10h30 - 11h30

PAVILLON FA: vonRoll hydrotec AG

Von Rollstrasse 24, 4702 Oensingen

Host: Jürg BRAND (CEO vonRoll hydro)

- Membrane construction over elliptical straw dome

13h00 - 14h00

REHABILITATION INDUSTRIAL BUILDING

Complemedis AG

Leinfeldstrasse 59, 4632 Trimbach

Host: Severin BÜHLMANN (CEO Complemedis)

- Ecological renovation
- External thermal insulation out of prefabricated strawbale elements
- Suspended bamboo facade as shading of existing window strips

15h30 - 17h30

HIT F 12

OTHER CASE PROJECTS WITH STRAW

Werner SCHMIDT/Atelier Werner Schmidt

- Presentation of other Projects
- Discussion with Werner Schmidt



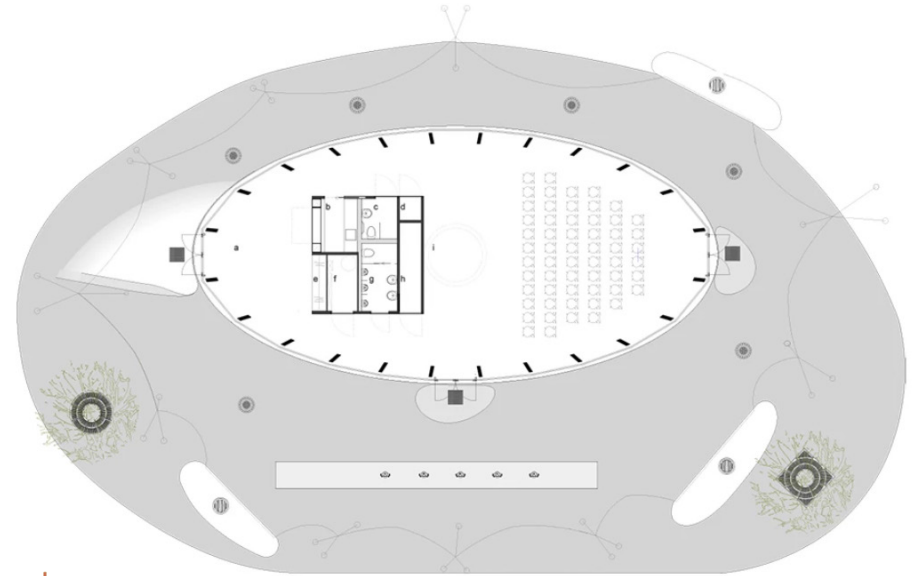
Gartist GmbH
Atelier Werner Schmidt
Photo Credit: © Atelier SCHMIDT GmbH | Atelier Werner Schmidt



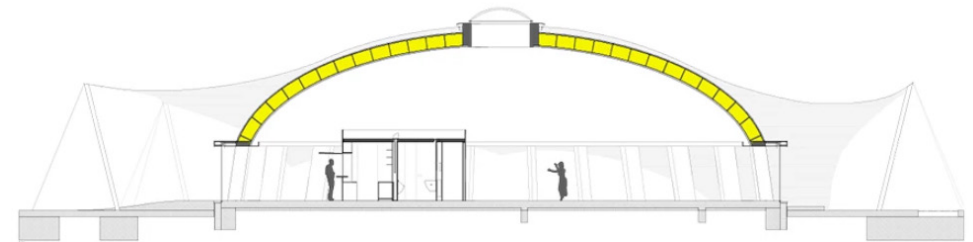
Complemedis AG (top), Haus Honsberger (bellow)
Atelier Werner Schmidt
Photo Credit: © Atelier SCHMIDT GmbH | Atelier Werner Schmidt



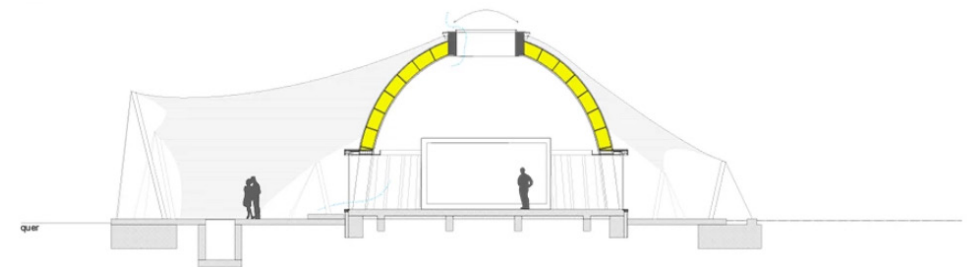
vonRoll hydrotec AG
 Atelier Werner Schmidt
 Photo Credit: © Atelier SCHMIDT GmbH | Atelier Werner Schmidt



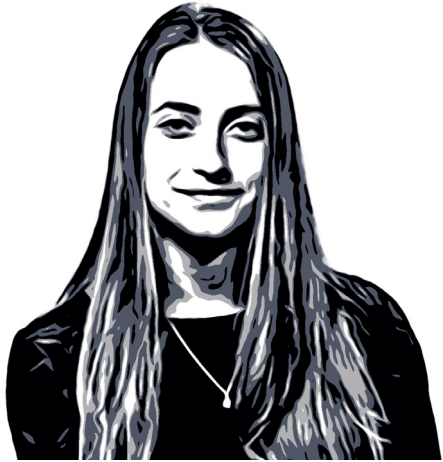
Floorplan



Longitudinal section



Transversal section

OLGA BEATRICE CARCASSI

Olga Beatrice Carcassi is a Research Scientist at the Natural Materials of Columbia GSAPP University. Previously, she was a Postdoctoral Researcher at the ABC Department of Politecnico di Milano, where she also obtained her Ph.D.

Passionate about regenerative and low-carbon technologies, her work concentrates on the definition 3D printed light fiber-clay materials. She also specializes in the advanced fabrication and LCA methodologies of mycelium-based composites to reach the climate-neutrality for the building and construction sector.



Mycelium-based composite
Photo credit: Lola Ben Alon

Wednesday 10.04.2024**09h00 - 10h30**

HIT F 12

TYPHA: INNOVATIVE MATERIAL

Georgi GEORGIEV / Dr. Georgiev Consulting

ethz.zoom.us/j/68439342566

- Big potential for resources from wetlands
- High insulation performance
- For renovation and new buildings

10h30 - 12h30

HIT F 12

FIRE SAFETY OF BIO-BASED MATERIALS

Michael KLIPPEL / Institute of Structural Engineering ETH

- What are the fire safety objectives?
- Which measures are used in order to guarantee the fire safety?
- Why must fire be regarded in design?

13h30 - 15h30

HIT F 12

LIME-HEMP CONSTRUCTION + BASICS OF HYGROTHERMAL BUILDING PHYSICS

Arnaud EVRARD / ETH Chair of Sustainable Construction

- Why do we need Building Physics?
- What are the main hygrothermal parameters of materials?
- What are the basics of the energy balance of a building?
- How to calculate heat and vapor transfer through walls?

16h00 - 17h00

HIT F 12

PUBLIC LECTURE: MYCELIUM-BASED COMPOSITES: HOW TO "BOND" WITH NATURE

Olga Beatrice CARCASSI / Columbia GSAPP University

ethz.zoom.us/j/65835442022

- What is mycelium?
- What is the fabrication process?
- How can we use mycelium-based composites in design and construction applications?
- Mycelium DYI

	MONDAY 08.04	TUESDAY 09.04	WEDNESDAY 10.04	THURSDAY 11.04	FRIDAY 12.04	
8		Private bus at 07h45		Private bus at 08h45		8
9	Introduction	House Honsberger	Typha: Innovative material	Straw-Bale construction: Building Systems & Case Studies	Isohemp: Industrial prefabrication with Lime-Hemp	9
10	Bio-based renovation of large building stock	Private bus				10
11	Transforming Natural Building Tradition	Pavillion Fa. vonRoll hydro	Fire Safety of bio-based materials		Ecococon: Prefabrication with straw	11
12		Private bus		Pittet Artisans		12
		Lunch		Lunch		
13		Industrial rehabilitation			Public Transport to Kulturpark	13
14	Dynamic LCA Lecture + Exercise	Private bus	Lime-Hemp construction & Basics of hygrothermal building physics	Hands-on Sprayed Earth Mix	Panel Discussion CLIMATE POSITIVE CONSTRUCTION Scaling up bio-based construction	14
15						15
16		Other case projects with straw	Mycelium-based biocomposites	Private bus	Informal discussion	16
17			Discussion			17
18						18



PITTET ARTISANS

Pittet Artisans perpetuates noble materials and ancient knowledge while sensitively adapting them to the constraints of the market to make them available to individuals and communities.

“Shot Earth”, sprayed earth concrete: A new type of rammed earth, based on dry-sprayed concrete technology. It's a mixture of stabilized excavated earth, aggregates and water consolidated by high-speed spraying rather than mechanical compaction.

Shot earth: Catalan vault and cobblestones in Biel/Bienne
Photo Credit: © Pittet Artisans



Sprayed earth mix on straw
Photo Credit: © Pittet Artisans

Thursday^{11.04.2024}

PRIVATE BUS from ETH HÖNGGERBERG

Busparking (beside Coop in front of HPT)

Meeting: 08:15

Departure: 08:30

Arrival: 11:00

09h00 - 11h00

STRAW-BALE CONSTRUCTION: BUILDING SYSTEMS + CASE STUDIES

<https://ethz.zoom.us/j/63901896616>

Vincent PIERRÉ / Terranergie

- From the field to the wall
- Diversity of construction techniques
- Constructive details
- Straw bale case studies

11h30 - 12h30

PITTET ARTISANS

Le Grand Pré 3, 1512 Chavannes-sur-Moudon

Sébastien PITTET / Pittet Artisans

- Visit of the new working space / workshop
- Open discussion on the work and philosophy of the company

LUNCH
BREAK

13h30 - 16h00

HANDS-ON: SPRAYED EARTH MIX

Le Grand Pré 3, 1512 Chavannes-sur-Moudon

Sébastien PITTET / Pittet Artisans

- Lime-hemp
- Lime plaster
- Shot earth
- Demonstration of spraying technics

PRIVATE BUS to ETH HÖNGGERBERG

Departure: 16:00

Arrival: 18:30



Bio-based and light earth workshop - CAS 2022
Photo credit: Polina Saante



Bio-based and light earth workshop - CAS 2022
Photo credit: Polina Saante

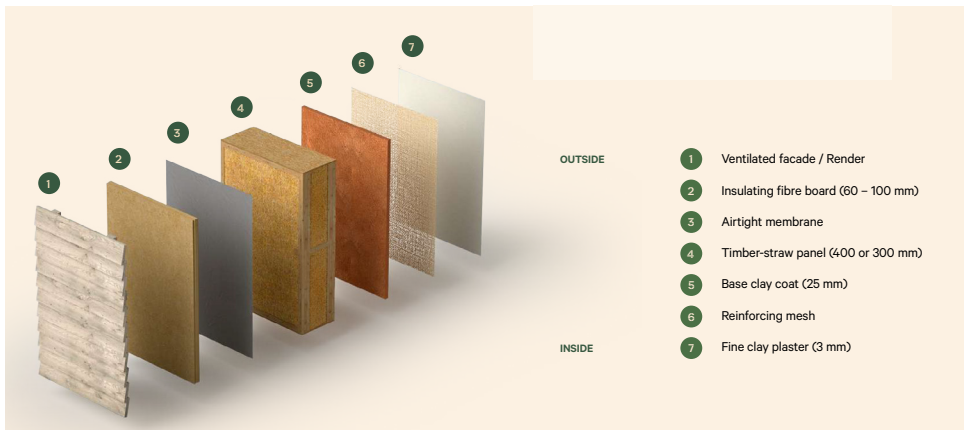


ECOCOCON

EcoCocon was founded with the idea to find a way to create real and affordable cradle to cradle buildings. Buildings that are made of renewable materials, and would last decades before being returned safely to nature after use. Buildings that would contain healthy, locally sourced materials and leave a minimal ecological footprint.

Why build a straw bale home?

- 01 Good fire resistance
- 02 Excellent insulation
- 03 Durable and resilient
- 04 Abundant and renewable
- 05 Natural carbon sink
- 06 Sound insulation



Prefabricated straw wall panels from EcoCocon

<https://ecococon.eu>

Photo Credit + Text: © EcoCocon

Friday 12.04.2024

9h00 - 10h30

HIT F 12

ISOHEMP: INDUSTRIAL PREFABRICATION WITH LIME-HEMP

<https://ethz.zoom.us/j/61825107880>

Charlotte DE BELLEFROID / Isohemp

- Prefabricated lime hemp blocks
- Promising company

11h00 - 12h30

HIT F 12

ECOCOCON: PREFABRICATION WITH STRAW

Bjørn KIERULF / EcoCocon

- Prefabricated walls - wood frame with straw insulation
- Very high insulation performance

14h00 - 17h00

Kulturpark: Pfingstweidstrasse 16, 8005 Zürich

ethz.zoom.us/j/61598617092

PANEL DISCUSSION:

CLIMATE POSITIVE CONSTRUCTION: SCALING UP BIO-BASED CONSTRUCTION

Dirk SCHARMER / FASBA (Special Guest)

Andrea AKCHOTI / Structura C

Guillaume HABERT / ETH Zurich

Bjørn KIERULF / EcoCocon

Fabian HÖRMANN / The Real Deal

- 14h00-15h00: Special Guest
- 15h00-15h30: Comments and discussion topics from other guests
- 15h30-16h30: Discussion

17h00 - 18h00

Kulturpark: Pfingstweidstrasse 16, 8005 Zürich

DISCUSSION WITH THE PARTICIPANTS



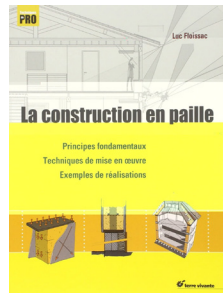
**CULTIVATED
BUILDING
MATERIALS***
Dirk E. Hebel
Felix Heisel
2019
EN



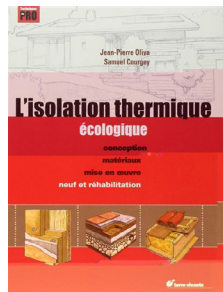
**VEGETARIAN
ARCHITECTURE.
CASE STUDIES
ON BUILDING AND
NATURE***
Andrea
Bocco Guarneri
2020
EN



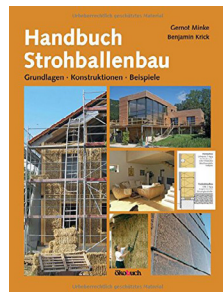
**REGLES
PROFESSIONNELLES
DE CONSTRUCTION
EN PAILLE***
Réseau français
de la construction
en paille
2018
FR



**LA CONSTRUCTION
EN PAILLE***
Luc
Floissac
2012
FR



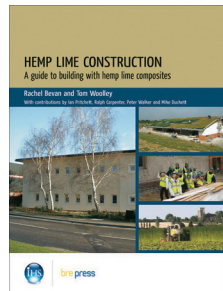
**L'ISOLATION
THERMIQUE
ÉCOLOGIQUE***
Jean-Pierre Oliva
Samuel Courgey
2010
FR



**HANDBUCH
STROHBALLENBAU.
GRUNDLAGEN-
KONSTRUKTIONEN-
BEISPIELE**
Gernot Minke
Benjamin Krick
2014
DE

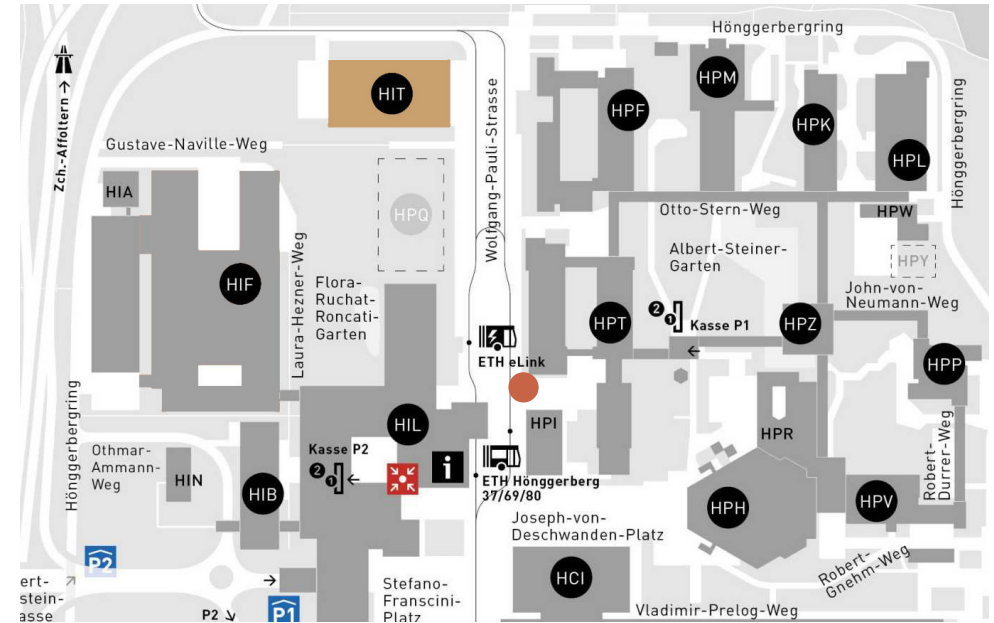


**BUILDING WITH
BAMBOO. DESIGN
AND TECHNOLOGY
OF A SUSTAINABLE
ARCHITECTURE**
Gernot
Minke
2016
EN



**HEMP LIME
CONSTRUCTION. A
GUIDE TO BUILDING
WITH HEMP LIME
COMPOSITES**

Rachel Bevan
Tom Woolley
2008
EN



 HIT F 12  Meeting point private bus



HIT

All the books whose title is followed by * are available at the Chair of Sustainable Construction for you to borrow.

GUESTS**Chair of Sustainable Construction ETH**

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