ROOFSCAPES transforming untapped roofs into accessible green spaces

Contact: hello@roofscapes.studio

2023 ULI Europe Young Leaders PropTech Innovation Challenge
By 2050, the climate of Paris (France) will be the same as the 2023 climate of Seville (Spain).
CONTEXT

Ever hotter city centers

Because of the use of artificial materials in roofing and a lack of vegetation, **European city centers are subjected to heat islands where temperatures can be up to 8°C greater than their rural surroundings.** This trend has further accelerated with global warming, as in the example of Paris:

Historic heat wave of 1973: **35.5°C**  
Heat wave of 2019: **42.6°C**

The situation is particularly **inhospitable** for those living and working under zinc, slate, and tile **roofs**, whose temperatures can reach above **80°C in summer**.
**CONTEXT**

Greening roofs to reduce the urban heat island effect and improve access to green spaces

**NEW CONSTRUCTIONS**

[Image of School in Boulogne-Billancourt, Chartier Dalix, 2014]

**RENOVATION OF FLAT ROOFS**

[Image of Opéra Bastille rooftop in Paris, Topager, 2017]

**ADAPTATION FOR PITCHED ROOFS**

**Green roofs cool** buildings, reinforce **urban biodiversity**, capture **stormwater**, absorb pollution, and offer high quality **exterior spaces** at the domestic scale. For these reasons, their installation is encouraged by urban resilience policies. However, their adoption is currently restricted to **flat roofs**.

92% of French people believe there is **not enough nature in cities**.
Unlocking the enormous potential of pitched roofs

In a city like Paris, 4 out of 5 buildings are covered by a pitched roof, making the installation of a traditional green roof impossible.

Roofs represent **1/3 of available horizontal space** in a city like Paris - a considerable opportunity for urban ecological transition. However, in French cities, **the majority of these roofs are pitched** and as such excluded from urban resiliency projects and the benefits of the ecosystemic services provided by green roofs.
European cities contain more than 4 million buildings with pitched roofs which can support the structural loads required for installing accessible green roof platforms.

Source: Commission européenne + Worldometer, 2020

In the Greater Paris region alone: 200,000 buildings could be adapted.
SOLUTION

Modular timber platforms - green and accessible

For a heat wave of 40 °C:

**Zinc roof**
- Surface temperature: 80 °C
- Air temperature 1 m above roof: 55 °C

**Timber platform**
- Surface temperature: 45 °C
- Air temperature 1 m above roof: 40 °C

**Timber platform + planted surface**
- Surface temperature: 40 °C
- Air temperature 1 m above roof: 35 °C

**Energy Savings**
Preventing the deployment of active cooling systems

**Health**
Greenery improves mental and physical health in office and residential buildings

**Rainwater**
During storms, green roofs capture rainwater, reducing strain on water retention networks.

**Temperature**
Perceivable temperature is reduced by plants and by shading the roof from direct sun.

**Green Space**
A shared garden above the existing building provides direct access to nearby green spaces.

**Biodiversity**
Urban ecosystems are supported by green roofs that provide habitat for local flora and fauna.

**Added Value**
The added real-estate value to buildings encourages co-owners to conduct renovations.
INNOVATIVE ASPECTS 1/2
A flexible model

In order to fit any roof, Roofscapes' system is designed to adapt to the unique features of each roof. The platforms are built around the existing fittings of the roof, such as skylights or chimneys, thus maximizing available green space for users.

**Step 1** - Site study by drone (photogrammetry)
**Step 2** - Overlay of modular grid
**Step 3** - Adaptation to obstacles
**Step 4** - Platform design

Series of aerial views showing conceptual system for adaptation to roof features
Adapting cities to climate change requires a **systemic approach**. Hence, Roofscapes platforms are based on **load-bearing walls** (whose structural capacities are reliable on any building) rather than on timber frames (whose condition varies from one building to another). This structural strategy means that Roofscapes’ approach can be **replicated** across the entire building stock of historic city centers.

**Step 1** - Locate load-bearing walls  
**Étape 2** - Anchor vertical supports  
**Étape 3** - Install primary structure  
**Étape 4** - Install green roof modules
COMPETITIVE LANDSCAPE 1/2
Benchmark of current roof uses

- Roof deck (not planted)
- Bituminous roof
- Zinc roof
- Tiled roof
- Reflective paint (cool roof)
- Wind turbine
- Solar panels
- Unaccessible green roof

Accessibility vs. Environmental value diagram

Roofscapes
COMPETITIVE LANDSCAPE 2/2
The only way to make pitched roofs green and accessible

Roofs must be **operational** to install planted surfaces and benefit from their **ecosystem services**. Though flat roofs can easily be greened by landscaping companies, there is no current player who **designs** projects on pitched roofs while **coordinating** the various sub-contractors required for their installation.

Roofscapes allows roof owners to **add value** to their property and enjoy the **untapped spaces** above their heads, while **preserving** architectural heritage and **greening** cities.
CURRENT PILOT PROJECTS
With condominium associations ...

Pilot project in Paris
Image: Roofscapes, 2022

Pilot project in Paris
Image: Roofscapes, 2022

Pilot project in Paris
Image: Roofscapes, 2022
CURRENT PILOT PROJECTS

... and public authorities

Pilot project in Paris
Model: Roofscapes, 2023
TEAM & TIMELINE

Eytan Levi
Co-Founder | Public Relations & Organization
EPFL, Bachelor’s in Architecture
MIT, Master’s in Architecture
MIT, Master’s in Real Estate Development

Tim Cousin
Co-Founder | Conception & Construction
EPFL, Bachelor’s in Architecture
MIT, Master’s in Architecture & Digital Fabrication

Olivier Faber
Co-Founder | Communication & Environmental Impact
EPFL, Bachelor’s in Architecture
MIT, Master’s in Architecture & Sustainable Design

Education | 2014-2017
Swiss Federal Institute of Technology
Lausanne, Switzerland

Education & Research | 2018-2022
Massachusetts Institute of Technology
Boston, Massachusetts, United States

Winner of the Renov’Action Hackathon | 06/2020
Ministry of Social and Environmental Transition
Paris, France

Shortlisted in the IGNfab Accelerator | 06/2020
National Institute of Geographical and Forestry Information
Saint-Mandé, France

Support | 12/2020-06/2022
Urban Lab @ Paris&Co (City of Paris’ laboratory for urban experimentation)
Paris, France

Exhibition | 12/2020-09/2021
2021 Seoul Biennale of Architecture and Urbanism
Seoul, South Korea

Member | since 07/2022
French Green Roof and Green Wall Association (Adivet)
Paris, France

Information and evaluation study “Paris at 50°C” by Paris City Council
Paris, France

Winner of the Innovation & Resilience call for projects | 12/2022
Paris Mayor’s Office
Paris, France

Support | since 03/2023
Le Perqo Incubator | Regional Council of Île-de-France x Schoolab
Saint-Ouen, France

New European Bauhaus Prize winner & ambassador | 06/2023
New European Bauhaus | European Commission
Brussels, Belgium

Coorganizer | 09/2023
Paris Rooftop Days
Paris, France
ROOFSCAPES
transforming untapped roofs into accessible green spaces

Contact: hello@roofscapes.studio

2023 ULI Europe Young Leaders PropTech Innovation Challenge