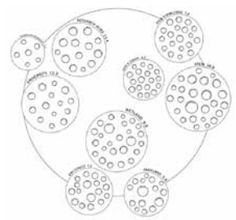
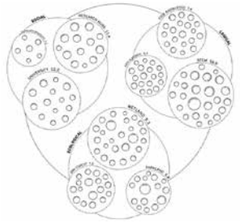
Otaniemi: Embracing Complexity

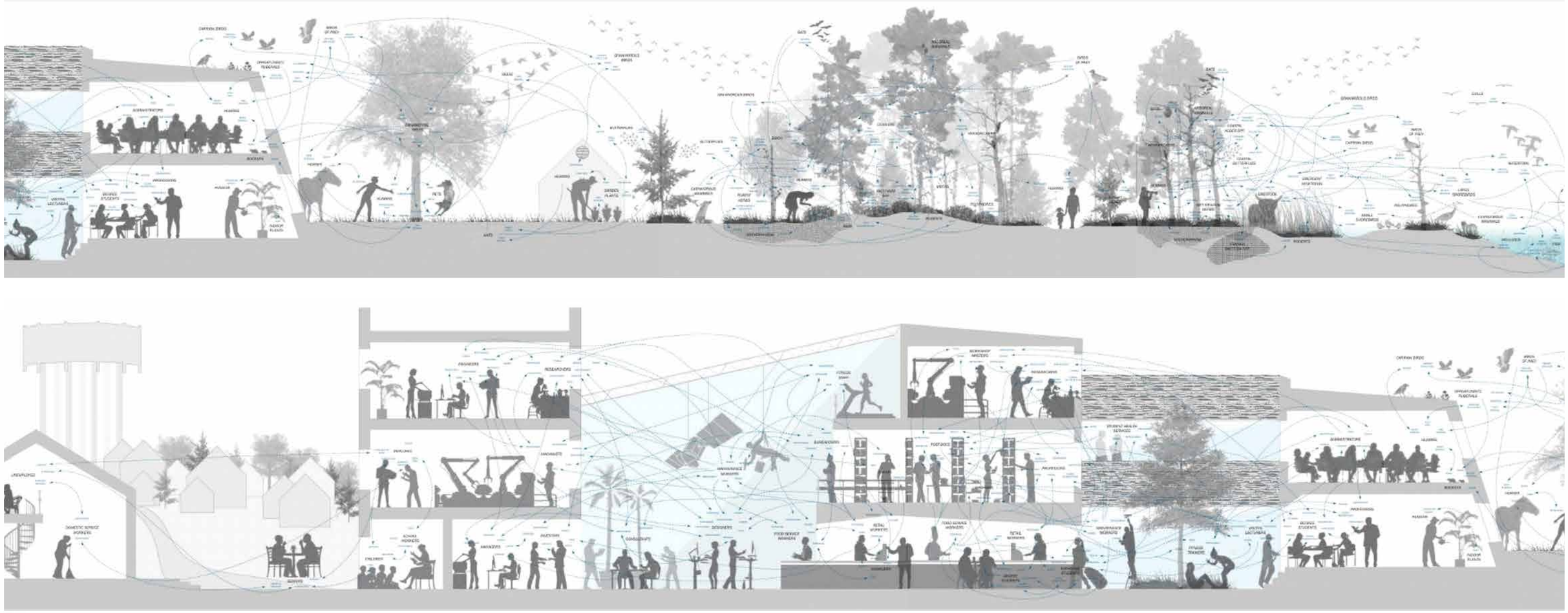
Actors

Typologies



Subsystems





Country / City	Finland, Helsinki
University / School	Aalto University - School of Arts, Design and Architecture
Academic year	2019-2020
Title of the project	Otaniemi: Embracing Complexity
Authors	Allan Delesantro, Elka Lupunen, Kati Efraimsson

TECHNICAL DOSSIER

Title of the project	Otaniemi: Emracing Complexity
Authors	Allan Delesantro, Elka Lupunen, Kati Efraimsson
Title of the course	Landscape Ecology in Planning: Otaniemi 2020>2050
Academic year	2019-2020
Teaching Staff	Prof. Juanjo Galan, Johan Kotze, Michail Galanakis
Department/Section/Program of belonging	Department of Architecture, Master's Programme in Landscape Architecture
University/School	Aalto University - School of Arts, Design and Architecture

Written statement, short description of the project in English, no more than 250 words

This project is part of a course based in two initial assumptions or hypotheses: Firstly, because of its systemic and pattern: process methods, landscape ecology and urban ecology can activate new ways of thinking and working in other city-related disciplines. Secondly, landscape ecology and urban ecology can foster multi-disciplinary and transdisciplinary approaches to the city by recognizing it as a complex and evolving socio-ecological system. The project identifies the city as a system of heightened complexity, embodied in the intricate weavings of social, ecological and logical subsystems. These weavings are simplified in the language of "connections"– interactions between two entities over a long-time span that benefit one or both of these entities.

Current systems of valuing (capitalism) focus on enlarging singular elements and following familiar patterns in order to minimize risk and achieve "optimal" outcomes. This produces a winner-take-all status quo, in social, ecological or logical systems, in which homogeneity and simplification ensure something predictable and profitable (Swyngedouw & Heynen 2003; Kay & Schneider 1994). This system of valuing leads to non-resilience by overlooking the latent values embodied in the complex web of actors required to ensure resilience (Beilin & Wilkinson 2015; Kay & Schneider 1994).

In this project the authors propose an alternative system of valuing that can be used to plan for places and systems which are complex, diverse and as a result, resilient. For this purpose, the authors defined and tested in Otaniemi (Finland) a theoretical and methodological framework to understand, plan and design complex interactions in socio-ecological systems.

For further information
Máster d'Arquitectura del Paisatge -DUOT - UPC

T: + 34 93 401 64 11 / +34 93 552 0842
Contact via email at: biennal.paisatge@upc.edu

Máster d'Arquitectura del Paisatge -DUOT - UPC
ETSAB- Escola Tècnica Superior
d'Arquitectura de Barcelona
Avenida Diagonal, 649 piso 5
08028 Barcelona-Spain

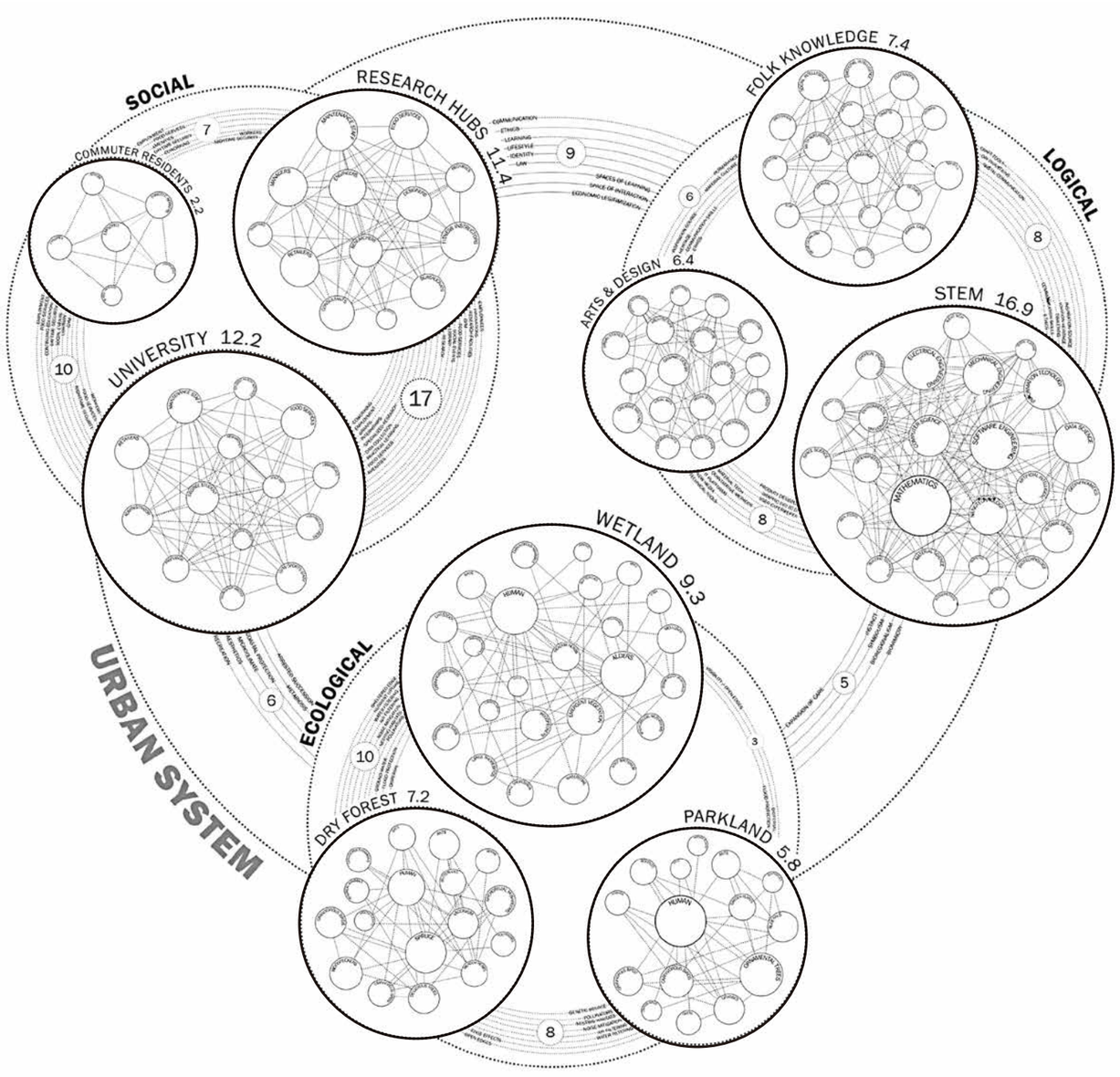
CLIMATE CHANGE AGAIN

11th International Biennial Landscape Barcelona

Barcelona September 2020

SCHOOL PRIZE

Measuring & Mapping Complexity



Complexity value of a patch =

1. (actor connectivity score x patch size)
+
2. (typology connectivity score x perimeter)
+
3. (subsystem connectivity score x adjacencies)

Connectivity Scores & Spatial Modifiers

Actor Connections

Actor connections occur internal to each typology. We have identified connections in which one or both actors have a benefit. Fot the purpose of our value system we ignore negative connections, like parasitism, predation or herb ivory to focus on those connections which contribute the most to resilience.

Actor Connectivity Scores

Actor connectivity scores are the sum off all connections found within a typology. A one-way connection receives a score of 0.1 points. A mutual connectios receives a score of 0.2 points.

Typology Connections

Typyology connections occur when one typology within a subsystem offers or receives a benefit from another system. These are different than actor connections because they are created and transmitted not by individual actors, but by the functioning of assembly as a whole unit.

Typology Connectivity Scores

Each pair of typologies receives a connectivity score based on the number of connections between them. Each connection is worth 1 point.

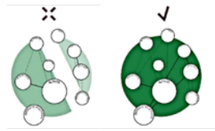
Subsystem Connections

Sybsystem connections occur when the functioning of an entire subsystem, consisting of all three typologies contributes a benefit it or service to another subsystem. These require translations between different realms of the material, social and cognitive and are thus often abstract.

Subsystem Connectivity Scores

Each pair of subsystems receives a connectiviy score based on the number of connections between them. Each connection is worth 1 point.

→ **Patch Size**

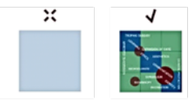


In the mapping of complexity values, actor connectiity scores are weighted by the size of the patch in which they occur. This takes into account the importance of large and continuous patches that allow all these actors to come into contact and thus actualize these connections. While these connections are still possible between fragmented patches, they are made more diff icult and fewer. Thus our scoring process generalizes that they are weaker because of this fragmenation.

→ **Edge Effects**

In the mapping of complexity values, typology connectivity scores are weighted by the length of the perimeter where the two typologies are in contact. This takes into account that direct contact allows the two typologies to participate in their connections more readily and promotes successful interactions of actors internal to those typologies.

→ **Mosaics**



In the mapping of complexity values, subsystem connectivity scores are weighted by the number of patches from other systems that the core patch comes in contact with. This takes into account the value of heterogeous patterns of land-use allowing more complexity and exchange of connections across systems.

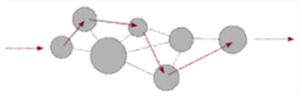
Hypotheses

Complexity

Connections are mutual interactions between actors.

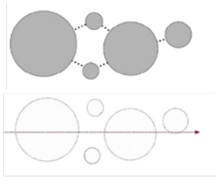
Resilience

Complexity leads to resilience through redundant connections.



A problem of valuing

Capitalist valuing leeds to reduced complexity.



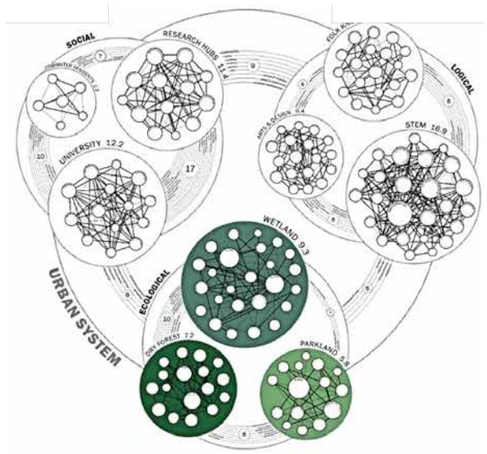
Envisioning New Connections

1 (actor connectivity score x patch size)

1+ 2 (typology connectivity score x perimeter)

1 + 2+ 3 (subsystem connectivity score x adjacencies) (subsystem connectivity score x adjacencies)

Ecological Subsystem



Diagnosis

Complexity performance is weak throughout the campus areas. Parkland benefit from adjacency to large forests. Forest suffer greatly due to fragmentation. Wetlands and forest produce a strong combination.

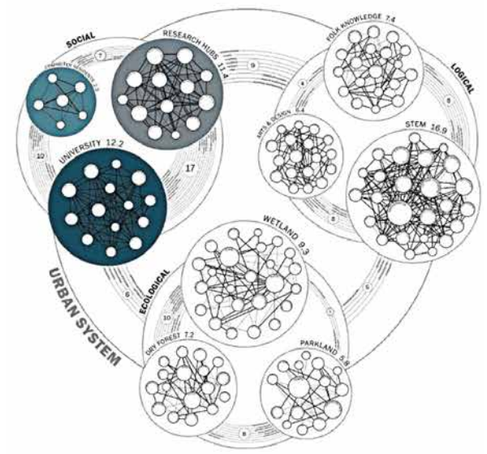
Spatial improvements

- Forest network
- Unified green campus
- Wetland restoration

Connectivity Score improvements

Dry meadow herbs
Pest management
Stormwater management
Cervids
Garden plants
Understory management
Spawning grounds
Water filtering
Bees
Psammophytes
Ecology as a study
Livestock

Social Subsystem



Diagnosis

Complexity performance is strongest in the large campus core which combines university and research typologies and benefits from adjacency to forest ecotopes. Fragmentation and segregation of research and university patches on the edges of Otaniemi causes weak scores.

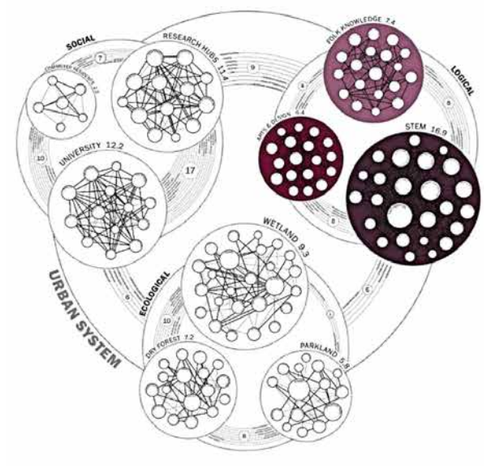
Spatial improvements

- Unified campus
- Mixed housing
- University expansion

Connectivity Score improvements

Produce
Food workers
Prototying
In-situ manufacturers
Resident scholars
Informal transit
Nature-based learning
Participatory research
Entertainers
Nightlife
Co-working
Crafts people

Logical Subsystem



Diagnosis

Complexity performance is strongest where all three logotopes interact since they have relatively equal typology connectivity scores. The high strength of STEM ativities is increased by their spatial concentrations.

Spatial improvements

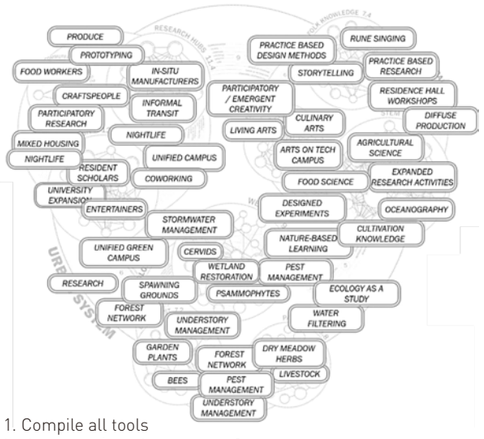
- Expanded research
- Arts on Tech campus
- Residence hall workshops

Connectivity Score improvements

Practice-based design methods
Culinary Arts
Designed experiments
Oceanography
Rune singing
Storytelling
Agricultural science
Cultivation knowledge
Living Arts
Partarticipatory-based design methods
Diffuse production
Food science

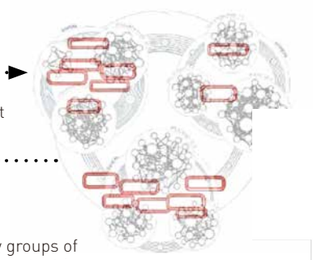
New Strategy for improving Complexity

Emergent Strategy: Learning fom the Landscape

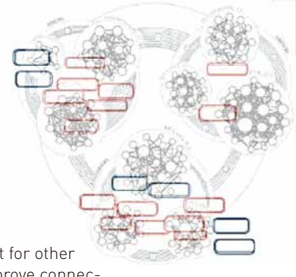


1. Compile all tools that emerge from the brainsorm phase.

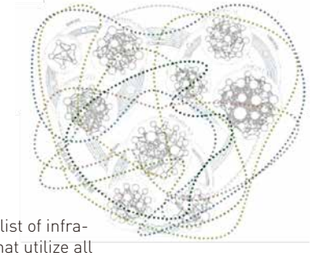
repeat



2. Identify groups of related tools that form common multi-functional infrstructure.



3. Analyse it for other ways to improve connectivity scores (marked in blue).

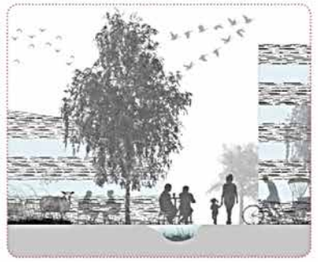


4. Aquire a list of infrastrutures that utilize all tools at least once.

5. Identify emergent strategy through shared goals.

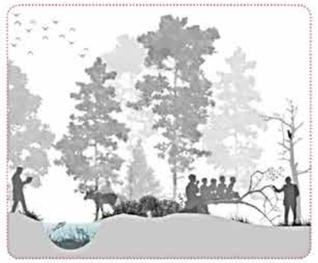
Campus Commons

THE CAMPUS COMMONS PROPOSAL SEEKS TO FORM A CONTINUOUS NETWORK OF PATHS AND PARKLAND UNINTERRUPTED BY ROADS OR PAVED SURFACES. WALKING PATHS WILL BE INTERWOVEN WITH A BIOINFILTRATION STORMWATER SYSTEM THAT CAN BECOME A DESIGNED EXPERIMENT AND THE OBJECT OF EXTENDED NATURE-BASED RESEARCH ACTIVITIES OF BOTH THE UNIVERSITY AND RESEARCH HUBS. NEW START-UP DIGITAL-DIFFUSE TRANSPORT SYSTEMS WILL GIVE AN ALTERNATIVE WAY FOR EMPLOYEES, STUDENTS AND RESIDENTS TO MOVE ABOUT THE NOW CAR-FREE CAMPUS.



Think Forest

THE THINK FOREST IS A CONTINUOUS FOREST NETWORK THAT BEGINS AT A NEW ECODUCT IN VILLA ELFIK AND FINGERS ITS WAY THROUGH THE UNIFIED CAMPUS. THE FOREST WILL BECOME A SPACE FOR OUTDOOR LEARNING AND COWORKING WITH OUTDOOR CLASSROOMS DESIGNED INTO THE FOREST CANOPY. THE FOREST WILL SERVE A DE FACTO ROLE AS A STORMWATER MANAGEMENT INFRASTRUCTURE. ITS CONNECTIVITY WILL SPONSOR THE ARRIVAL OF CERVIDS MOVING FROM KESKUSPUISTO. THE PROJECT WILL INCLUDE RESTORED STREAMS THAT SERVE AS SPAWNING GROUNDS FOR SEA FISH.

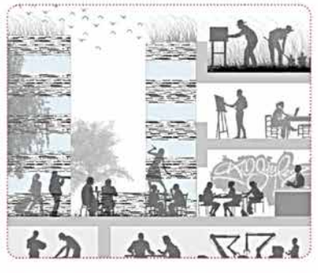


Agriculinary Network

THE AGRICULINARY NETWORK WILL CREATE A NEW CULINARY ARTS AND AGRICULTURAL SCIENCES PROGRAM AT THE UNIVERSITY WHICH IS SUPPORTED BY A DIFFUSE PARTICIPATORY RESEARCH NETWORK OF URBAN AGRICULTURE PROJECTS. THESE PROJECTS WILL INCLUDE EXPERIMENTAL METHODS OF WILDLIFE-BASED PEST MANAGEMENT. LAWNS WILL BE GRAZED BY PRODUCTIVE LIVESTOCK AND FORESTS MORE ACTIVELY UTILIZED FOR FORAGING, BEE KEEPING AND UNDERSTORY AGRICULTURE. PRODUCE OF THE PROJECT CAN BE SOLD IN FOOD TRUCKS RUN BY LOCAL ENTREPRENEURS.

Generator Residences

THE GENERATOR RESIDENCES PROJECT WILL CREATE MULTIFUNCTIONAL RESIDENCES AS AN EXPANSION OF THE UNIVERSITY AND RESEARCH CAMPUSES. THE INSTITUTIONS WILL RESERVE HOUSING FOR SCHOLARS IN RESIDENCE FROM VARIOUS DISCIPLINES AS WELL AS NON-UNIVERSITY COMMUTER RESIDENTS TO CREATE MIXED HOUSING. WORKSHOPS WILL ENCOURAGE NEW PARTICIPATORY PRODUCTION. MUSICIANS, STORYTELLERS, AND OTHERS CAN BE INVITED. THEATRES AND BARS WILL BUILT INTO THE RESIDENCES TO PROVIDE NIGHTLIFE AND A VENUE TO SHARE ARTS AND CULTURE.



Eco-Beach

ECO-BEACH WILL BE BUILT ALONG OTANIEMI'S EAST SHORE TO PROVIDE NEW HABITAT FOR PSAMMOPHYTES AND RESTORED WETLANDS. NEW RECREATIONAL OPPORTUNITIES WILL BE CREATED AS AN EXPANSION OF THE UNIVERSITY. EXISTING DOCKS CAN BE RELOCATED AND IMPROVED TO HOUSE A NEW OCEANOGRAPHY PROGRAM. THE BEACH WILL BE RESEARCHED FOR ITS ABILITY TO SUPPORT BIODIVERSITY AND RECREATIONAL NEEDS VIA DIFFERENT MANAGEMENT STRATEGIES. IT WILL ALSO BE TESTED AS A STORMWATER AND COASTAL PROTECTION FEATURE.

Final outcome visualizes the learnings from the landscape