

Want to come fight the climate and biodiversity crisis?

Master thesis topics with Jonas Lembrechts (PLECO) and The 3D Lab

Want to know more?
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www.the3dlab.org





We have a
place for you
if you...

- ... want to join the biggest global study on the effects of climate and land use on **mountain** plants
- ... want to work in some of the largest **citizen science** projects ever
- ... want to dive into unique **historical datasets** to search for the fingerprints of climate change

... love plants, birds, insects and/or microbes

... love mountains, botanical gardens and/or
Flemish nature

... love citizen science

Topics part I

Scandinavian mountains



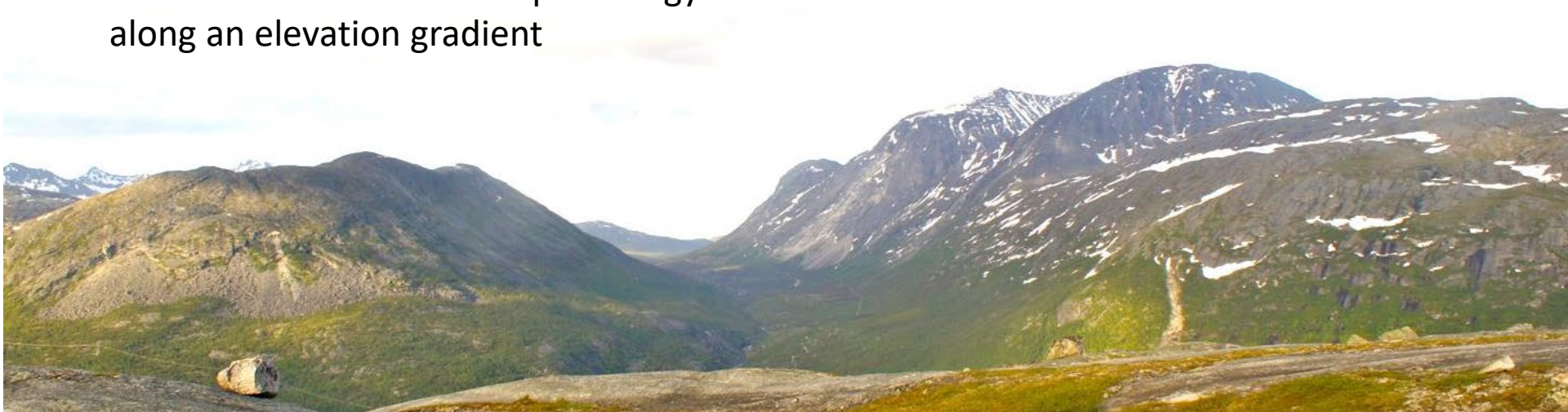
1. Mapping microclimate across northern Scandinavia
2. Effect of microweather on phenology along an elevation gradient

Topics Part II

CurieuzeNeuzen in de Tuin



1. Nature as airconditioning for the city
2. The lawn microbiome: a wasteland?



Topics part III

Botanical garden



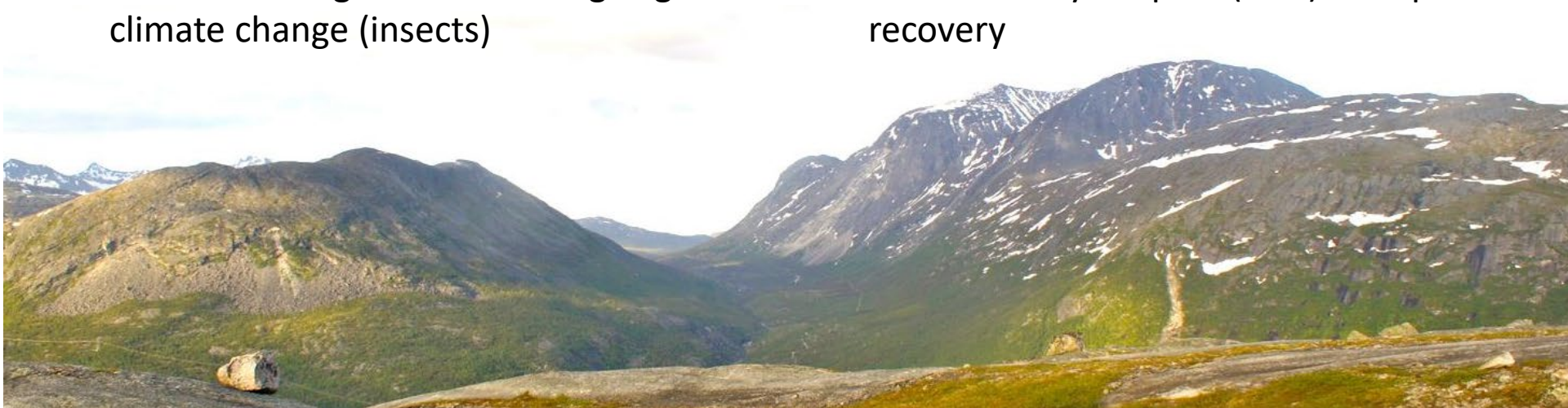
1. The botanical garden as a refuge against climate change (plants)
2. The botanical garden as a refuge against climate change (insects)

Topics Part IV

Urban soundscapes



1. Spatial distribution of urban birdsong
2. The need for quiet green spaces around the university hospital (UZA) to improve recovery



Topics part I - Scandinavian mountains

1 – Mapping microclimate across northern Scandinavia

- Make use of one of the most extensive microclimate monitoring networks in the world
- Make high-resolution maps of microclimate variation using topography and vegetation data from remote sensing
(with Dr. Keith Larson (Sweden))

2 – Effect of microweather on phenology of alpine plants

- Travel back in time: 100+ year old phenological survey data
- Resurvey the same mountain and see what has changed
- Test the effect of local weather patterns on phenology
(with Dr. Keith Larson (Sweden))



Topics part I - Scandinavian mountains

The practical part

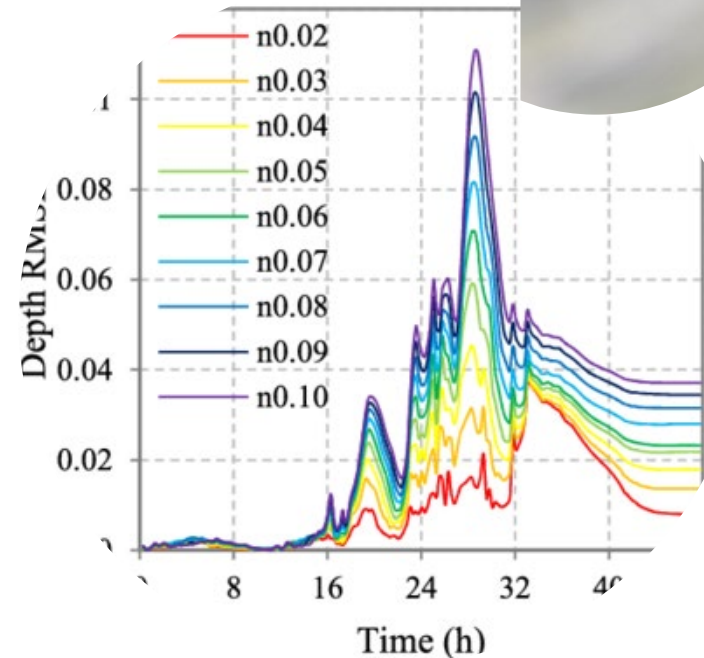
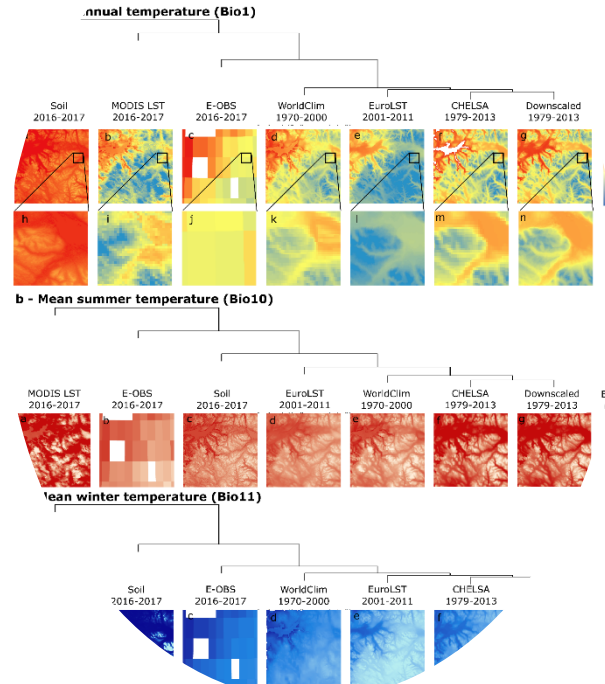
- 20-40d fieldwork in summer 2024 in Norway/Sweden
- Mountain hiking involved
- Interest in plants required



Topics part I - Scandinavian mountains

Applied methods

- **Fieldwork (both)**
 - Plant species inventories
 - Be part of an enthusiastic team
- **Analyses afterwards (depending on topic)**
 - Historical vegetation surveys
 - Microclimate timeseries
 - Modelling in R and GIS



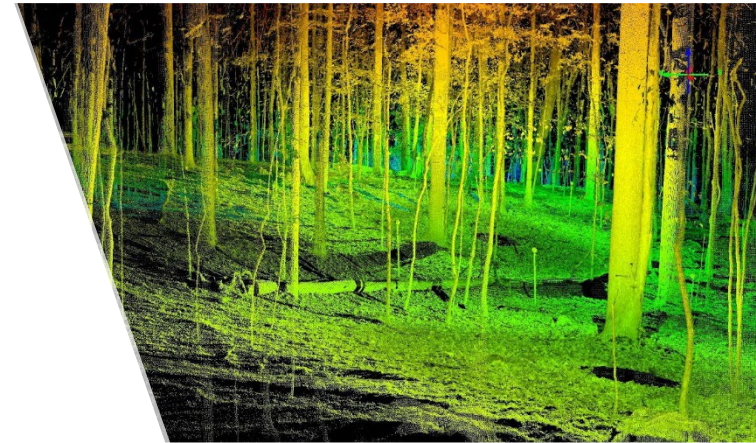
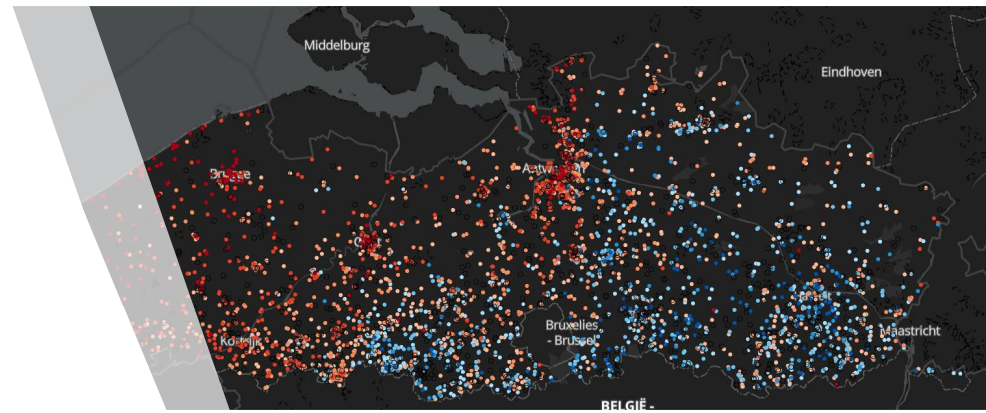
Topics part II – CurieuzeNeuzen in de Tuin

1 – Nature as airconditioning for the city

- Join CurieuzeNeuzen in de Tuin, the biggest citizen science project **on climate change** ever
- Use data from ongoing measurements in Mechelen to quantify how much cooler different natural habitats are compared to the city
(with *Stijn Van de Vondel*)

2 – The lawn and agricultural microbiome: a wasteland?

- Use DNA-analyses of microbial communities in lawns, agricultural fields and natural vegetation
- Compare the complexity of their networks to answer the questions: are agricultural and garden soils dead wastelands, or thriving with life?
- Data analysis, likely no field- or labwork involved
(with *Prof. Erik Verbruggen*)



Topics part II – CurieuzeNeuzen in de Tuin

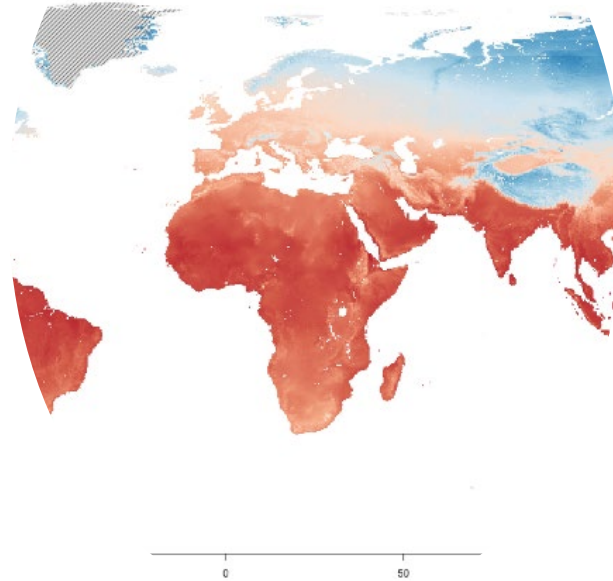
Applied methods

Fieldwork

- Only for the 'airco' project
→ microclimate monitoring in
Mechels Broek and environment

Data analyses

- Airco project:
 - Strong focus on GIS-analysis and spatial data processing
 - Modelling and map-making in R and/or ArcGIS
- Microbiome project:
 - Strong focus on the use of DNA-data
 - Network analyses



Topics part III – Botanical gardens

The botanical garden as a refuge against climate change

- Explore the little oasis of the botanical garden Jean Massart in Brussels
- Install a network of microclimate sensors to measure the cooling effect (and the large variation in microclimate) in the botanical garden
- Monitor biodiversity within the botanical garden
 - Botanical biodiversity (using 1x1 m vegetation plots) – Topic 1
 - Ground-dwelling insect biodiversity (using pitfall traps) – Topic 2
- → Discover species that are hiding out against climate change in the cool oasis of the botanical garden

(with the Université Libre de Bruxelles (ULB))



Topics part III – Botanical gardens

Applied methods

Fieldwork

- Microclimate monitoring
- Vegetation monitoring OR insect monitoring
- In botanical garden Jean Massart - Brussels
- Throughout summer 2024
- Hunting for cool and rare species (plant/insect enthusiasm is a big plus!)

Data analyses

- Exciting GIS-analysis and spatial data processing
- Modelling and map-making in R and/or ArcGIS



Topics part IV – Urban soundscapes

1 – Spatial distribution of urban birdsong

- Join **De Oorzaak**, the biggest citizen science project on urban sounds ever
- Using a smart sound sensor network across Antwerp, Ghent and Leuven, we will monitor all sounds, and automatically classify its source
- Use this data to map the spatial (and temporal) distribution of bird songs and bird diversity throughout the city

2 – Quiet green spaces around the university hospital

- As part of 'De Oorzaak', you will help us answer the very interdisciplinary question about the importance of (quiet) nature on the campus of UZA to improve recovery
- Use a combination of patient questionnaires and data from our smart sensor network to see how quiet UZA is, and how important such quietness is



Topics part IV – Urban soundscapes

Applied methods

- Join the rollercoaster of a large-scale citizen science project
- Work with data from our smart sound sensor network
- For the birds:
 - Strong focus on spatiotemporal data analysis
- For the UZA:
 - Strong focus on interdisciplinarity
 - Use of questionnaires



More information

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