

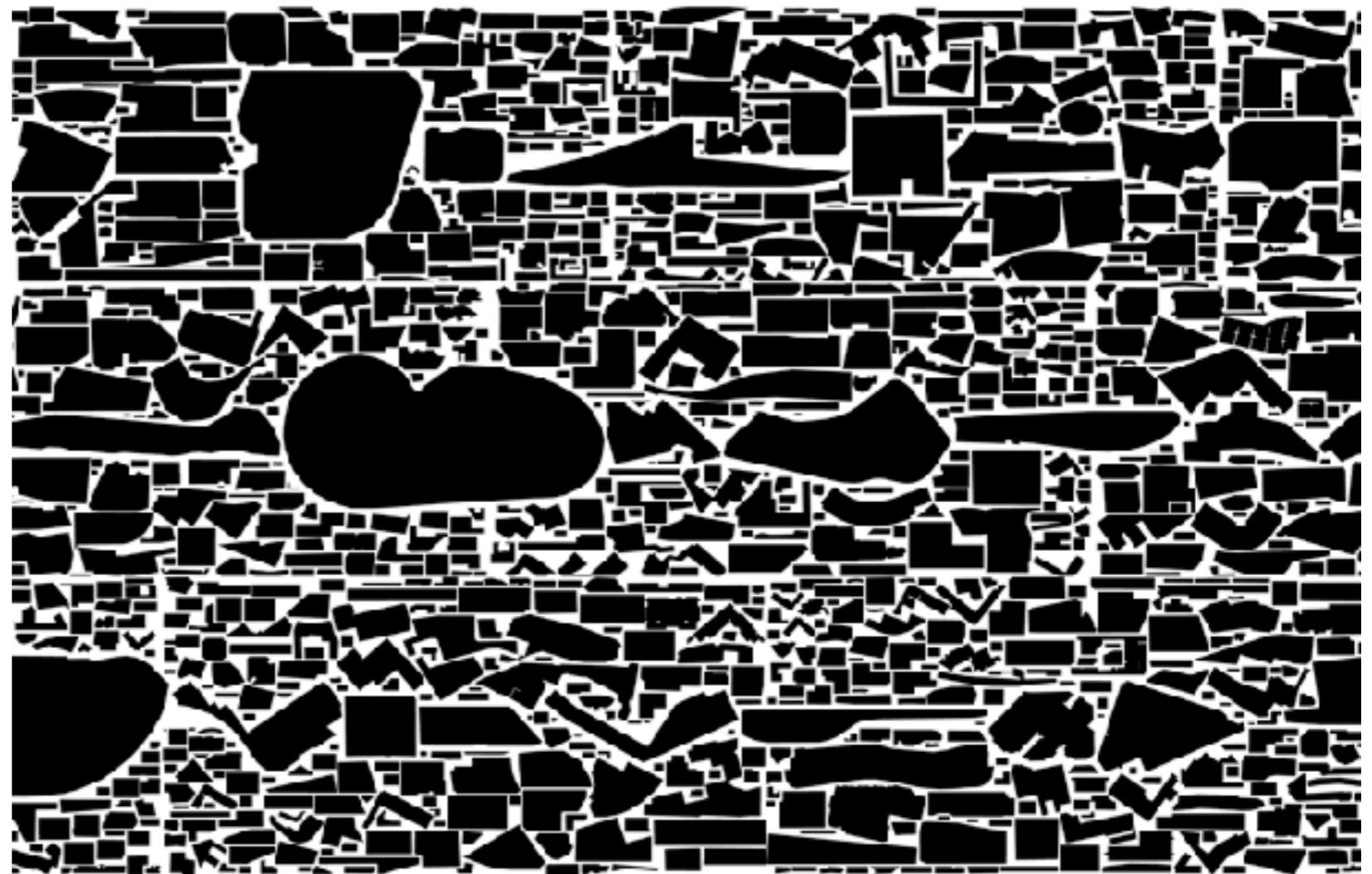


# Understanding wasted mobility space with crowdsourced urban data

---

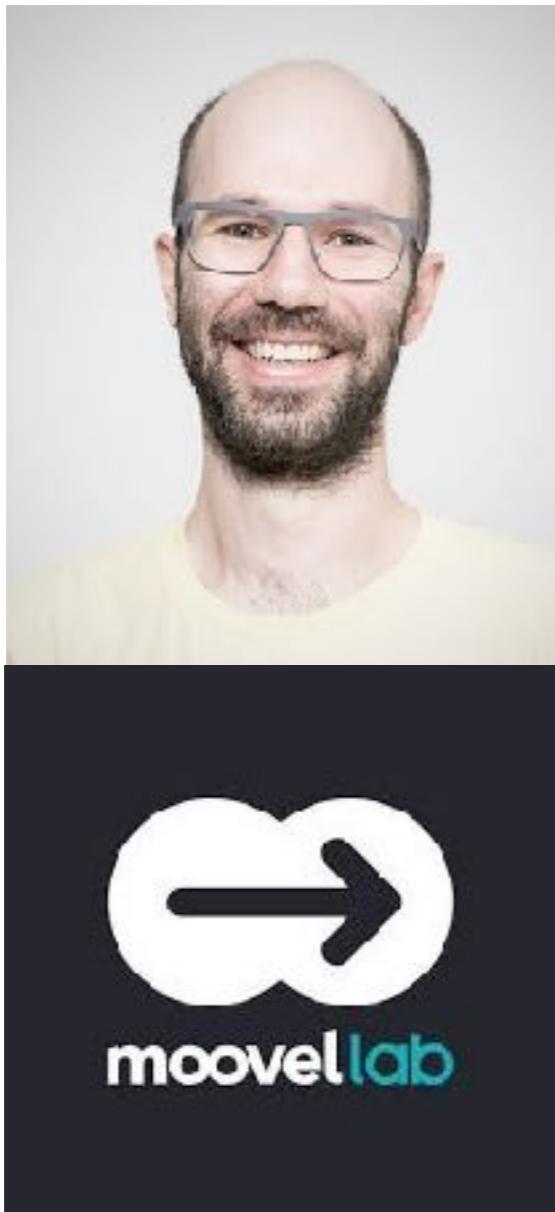
Copenhagen, May 23, 2019

Michael Szell  
ITU Copenhagen  
[@mszll](https://twitter.com/mszll)



with: Stephan Bogner, Benedikt Gross, Tobias Lauer, Anagrama, Tilman Häuser,  
Raphael Reimann, Daniel Schmid, Joey Lee, Johannes Wachs, Thibault Durand

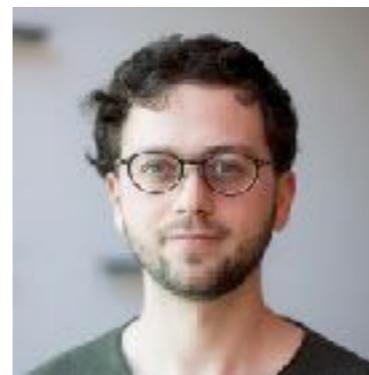
# 2016 September: Starting a mobility project in Stuttgart



Come to Stuttgart.  
Joey will be there too!



And a new guy: Stephan



# Our "plan": Let's visualize some urban data!

## Visualizing the impact of integrated car sharing

Project plan by Michael Szell

Various studies have shown that in their conventional use, cars are parked around 95% of the time [1]. This inefficient use of resources has fundamental implications on how we use space in cities, where a large number of parking spots occupy valuable public space. The introduction of wide-spread car sharing has the potential to re-appropriate large areas of this public space, for new parks, bike lanes, etc., decreasing the wasteful use of space, and significantly increasing quality of life in cities.

Despite these well-known benefits of car sharing, the transition from traditional use of individualistic car ownership to car ownership as a public shared good [2] is delayed due to the collective nature of the benefits that are hidden from individuals, and due to the continuous



Sorted Cities Hans Hack



Legend:

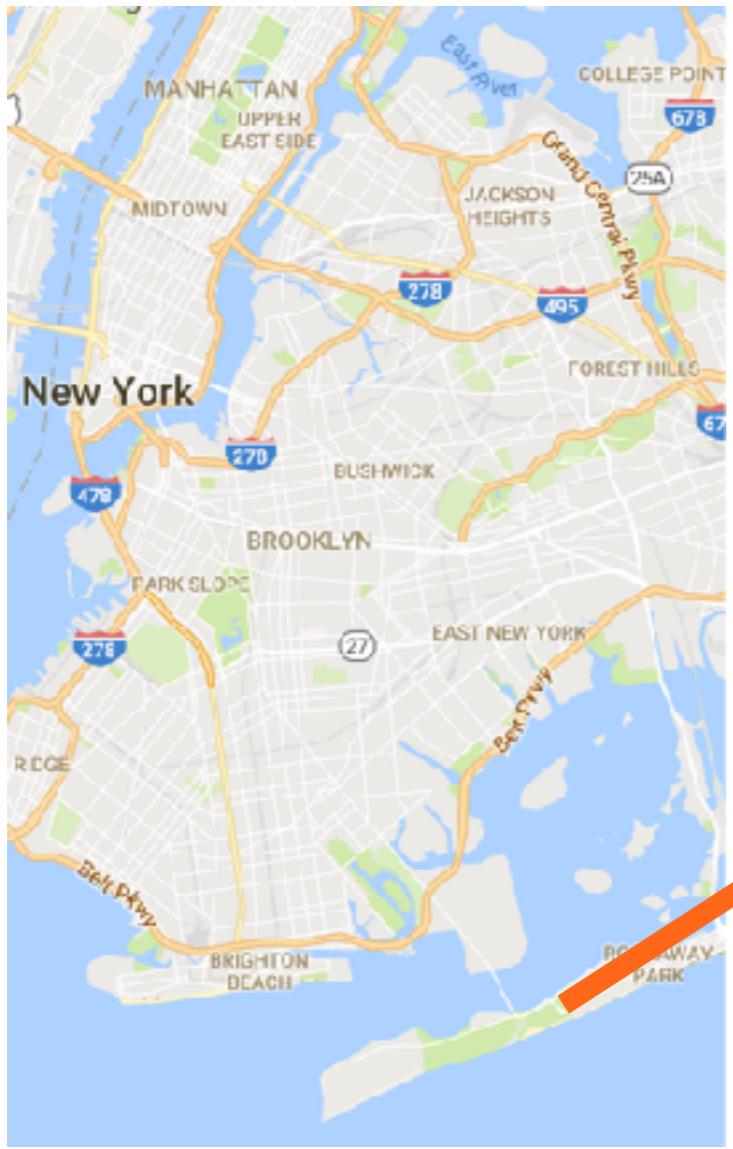
Arc: Straße  
Alt-Weg: Alte Straßen, Abzweige von Schloßpark, Anderthalb-Stadt  
Bauabschnittsgrenze: Vorgartenstraßen, Hochstraße, Gasse mit breiteren Straßen  
Brücke: Brücke, Eisen-Brücke, Pfad-Brücke, Friedensbrücke, Steinerne  
Geflechtedecke: Gepflasterte Straße, Hartpflaster, Holzpfosten  
Hausgruppe: Mietshaus, Villenhaus, Straße, Ziegelpfosten, Schotterstraße  
Innenhof: Innenhof, Kapelle, Kapuziner-Platz, Waisenhaus, UMT, Vauban  
Nagelfluh: Nagelfluh, Kiesdamm, Kiesdamm, Kiesdamm, Kiesdamm  
Klein-Landstraße: Überpflasterter Weg, gepflasterter Weg, gepflasterter Meldung-Hauptstraße, Mosaiksteine, Mosaikstein, Mosaikstein, Mosaikstein  
Neckarkanal: Neckarkanal, Neue Donau, Kanalhöfe, Kanal  
Straße Ober-W. Viertel: Pflasterstraße, Pflasterstraße, Pflasterstraße, Pflasterstraße  
Reiniger Platz: Reiniger Platz, Reiniger Platz, Reiniger Platz  
Römerstraße: Römerstraße, Schlossberg  
Schloßpark: Schlosspark, Schlosspark, Schlosspark  
Schloßstraße: Schlossstraße, Schlossstraße, Schlossstraße  
Sternplatz: Sternplatz, Sternplatz  
Stadtport: Stadtport  
Tiefgarage: Tiefgarage, Tiefgarage, Tiefgarage  
Unter-S. Markt: Unter-S. Markt, Unter-S. Markt  
Viertel: Viertel, Viertel, Viertel, Viertel  
Viertelmarkt: Viertelmarkt, Viertelmarkt, Viertelmarkt, Viertelmarkt  
Wald: Wald, Wald, Wald, Wald

Ursus Wehrli

After 6 weeks of brainstorming

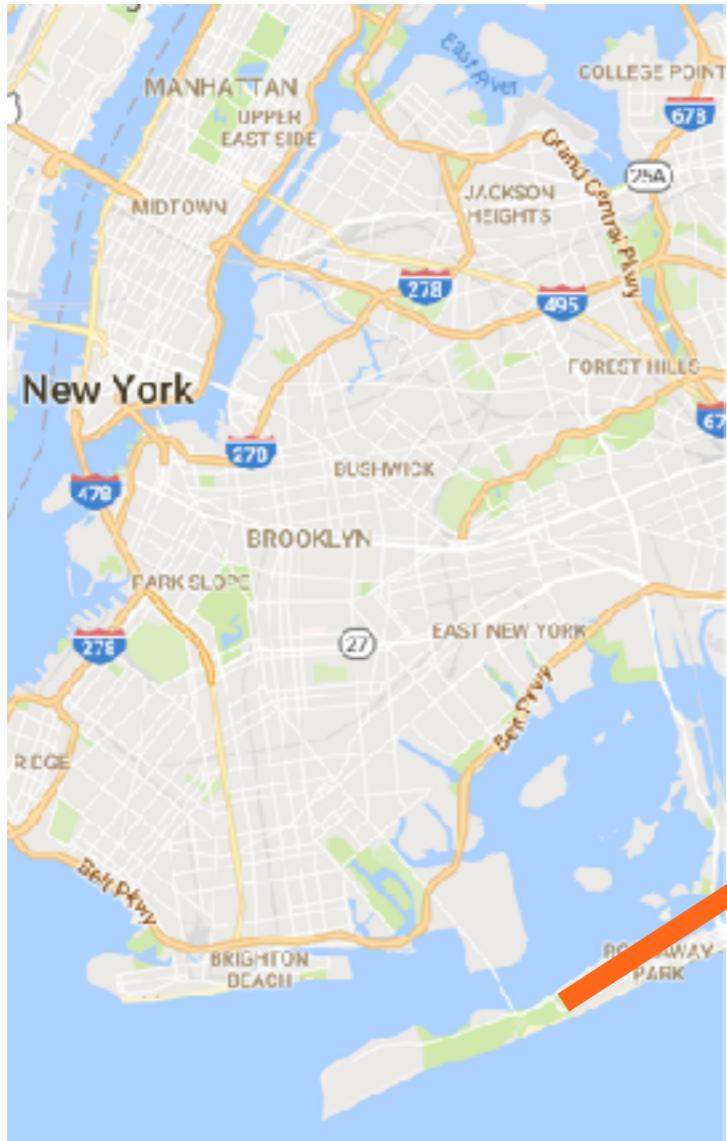


I HAVE NO  
IDEA WHAT  
I'M DOING



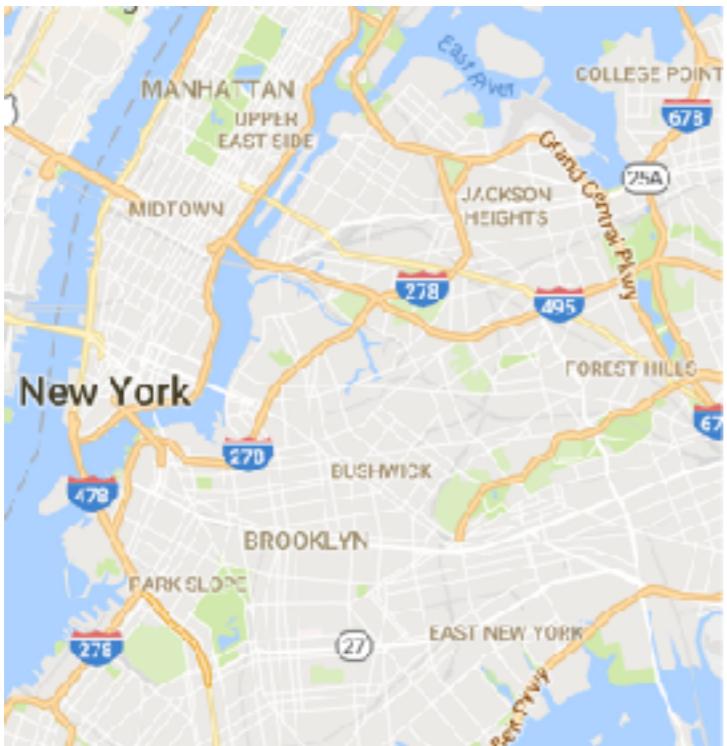
What a lovely green..



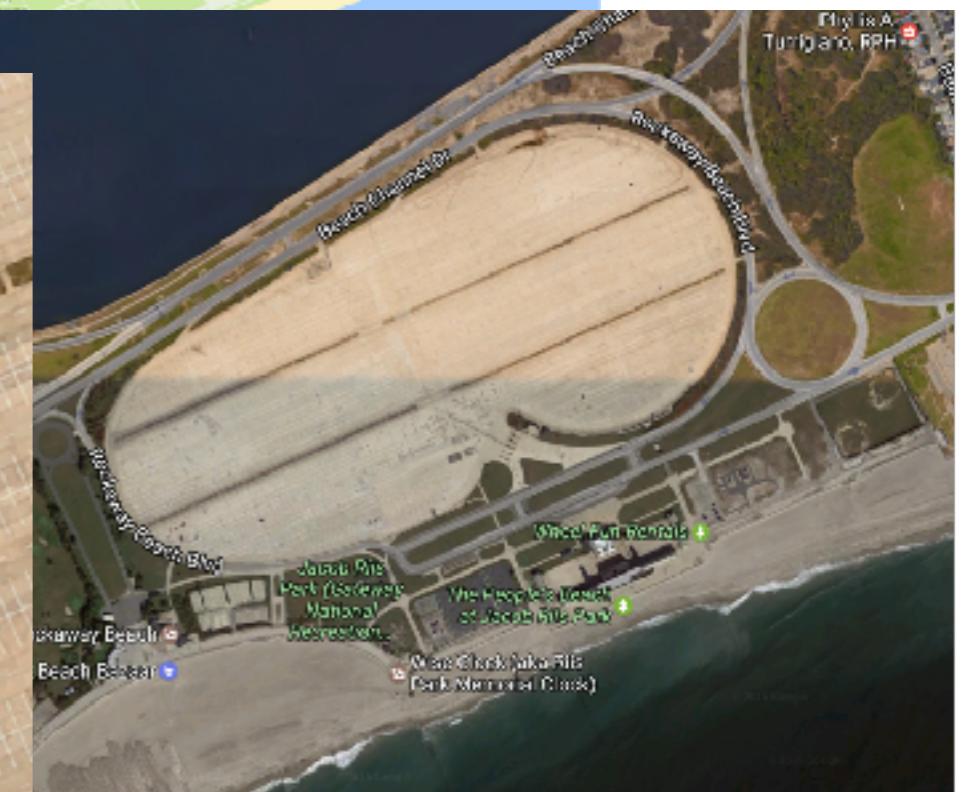
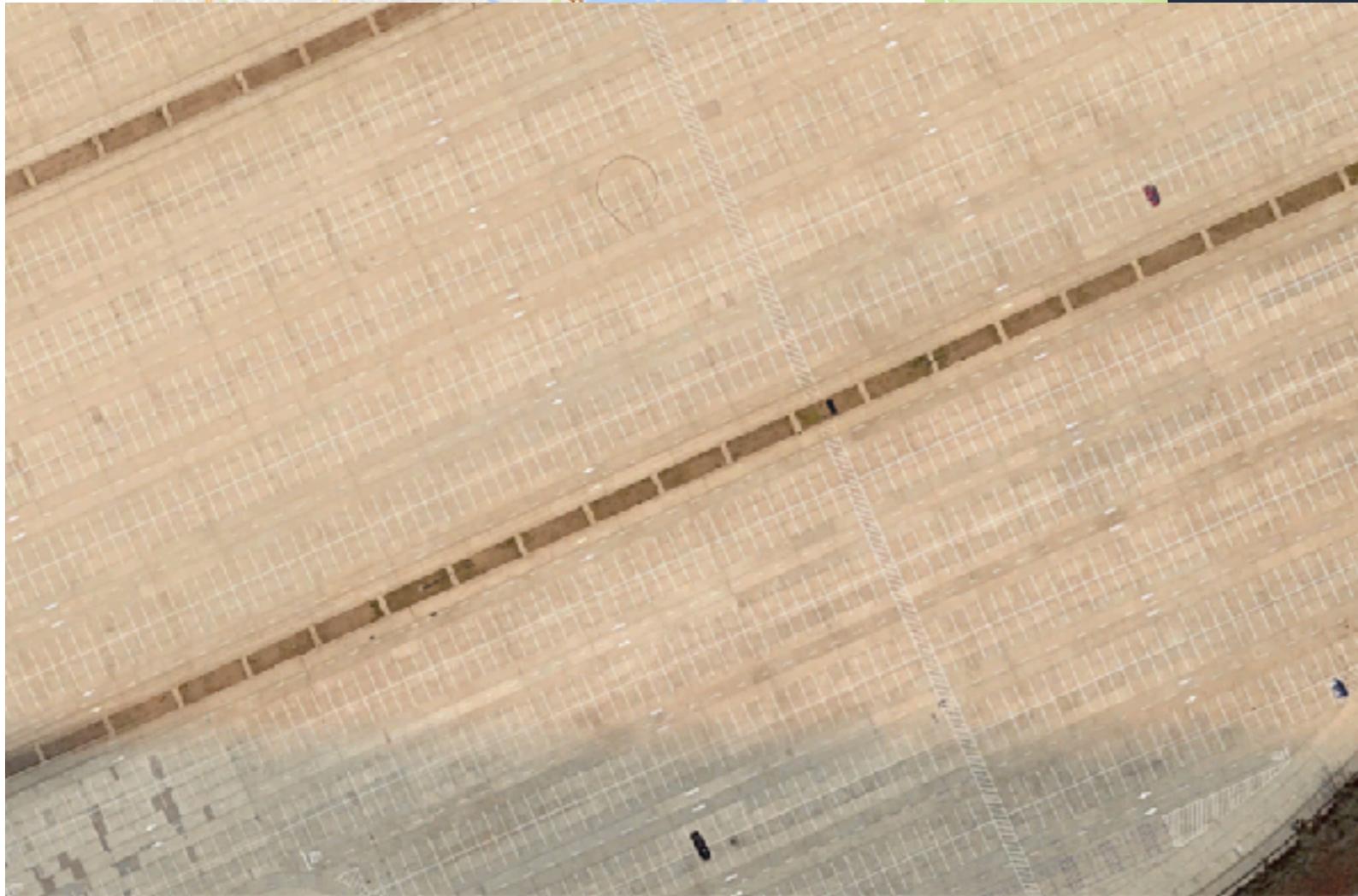
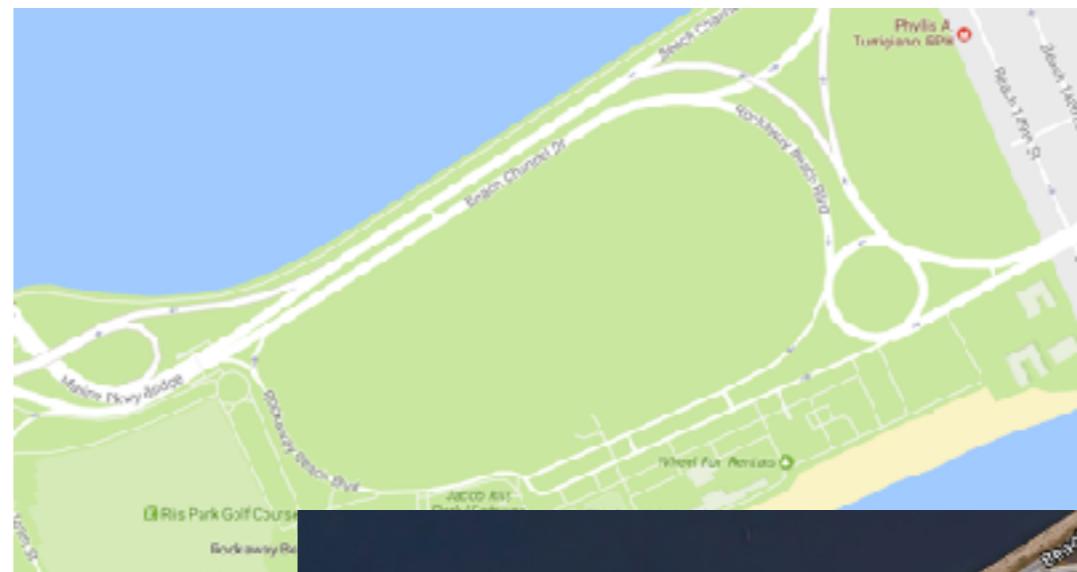


What a lovely ~~green~~...

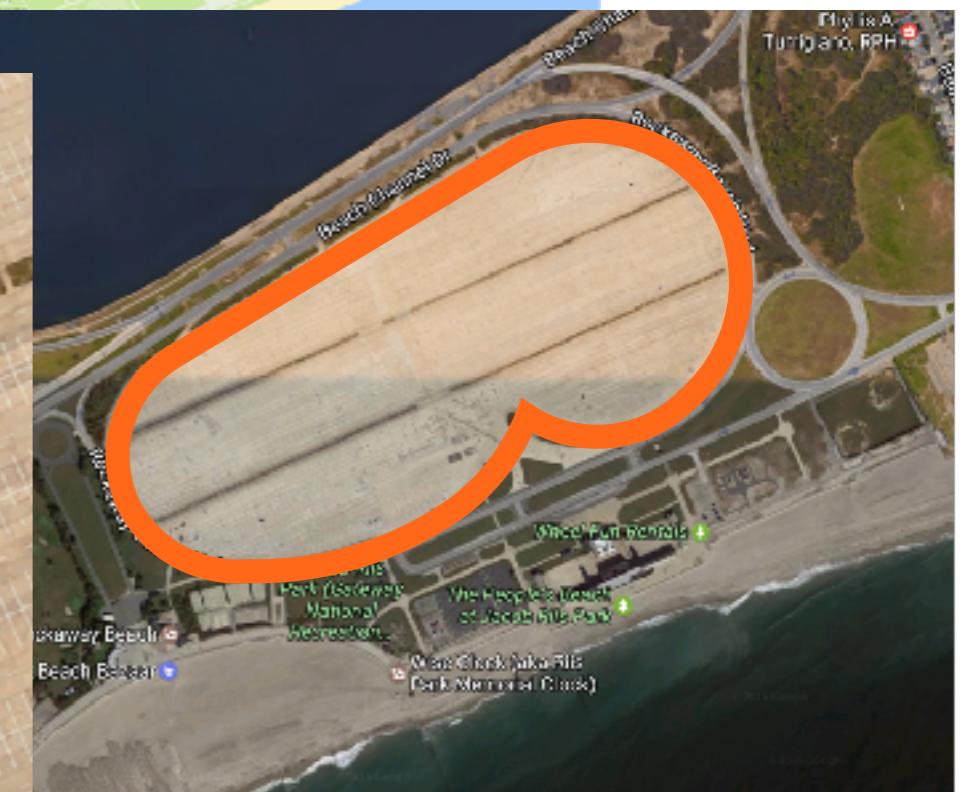
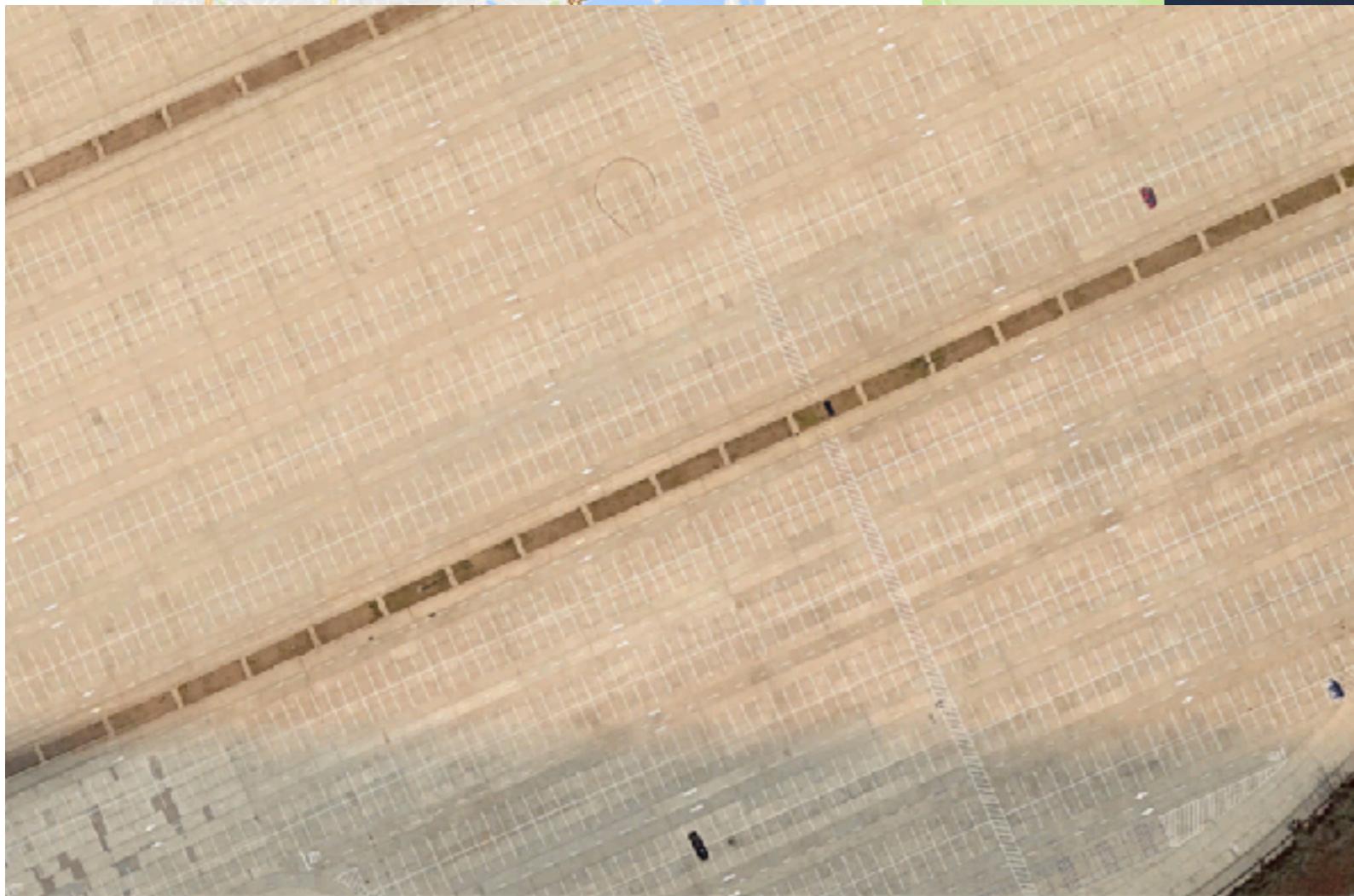
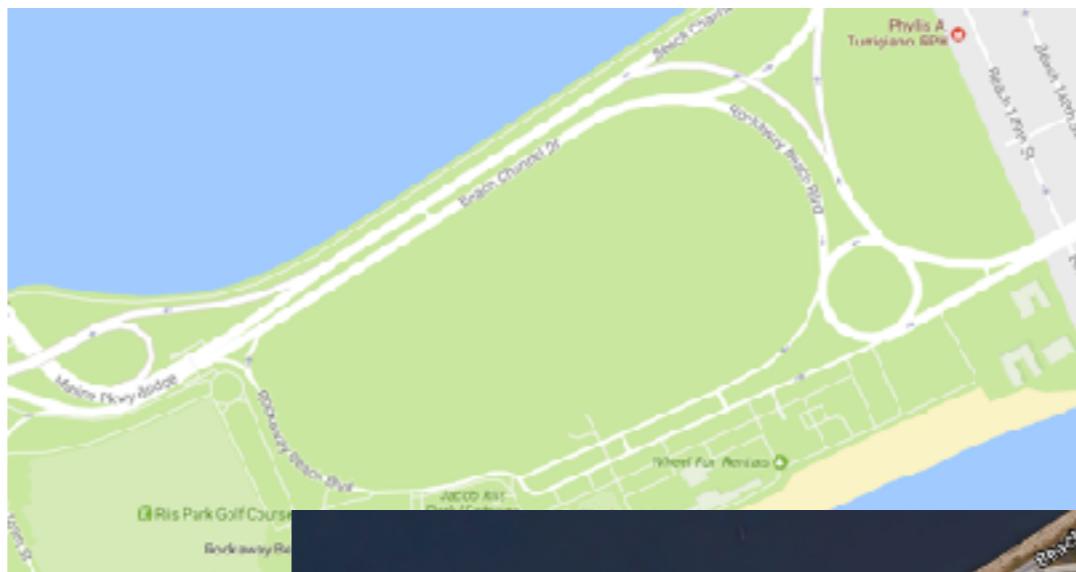




What a ~~lovely~~ green.. MONSTER



800m x 500m

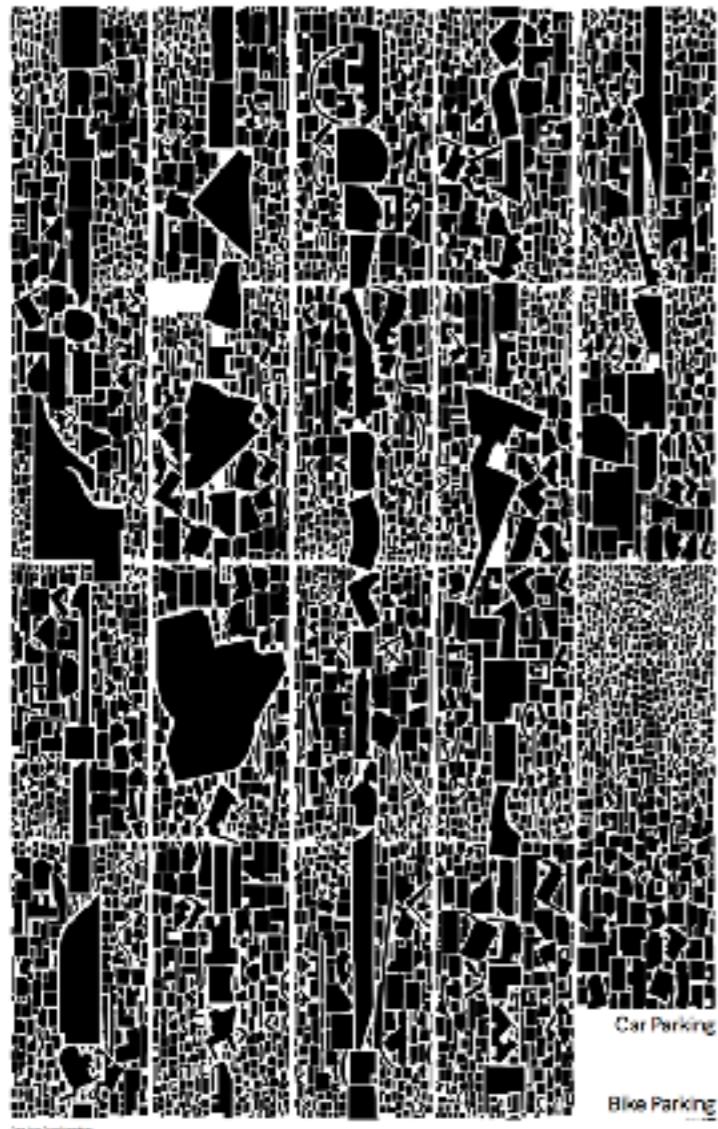


We used polygon packing to visualize ALL parking spaces

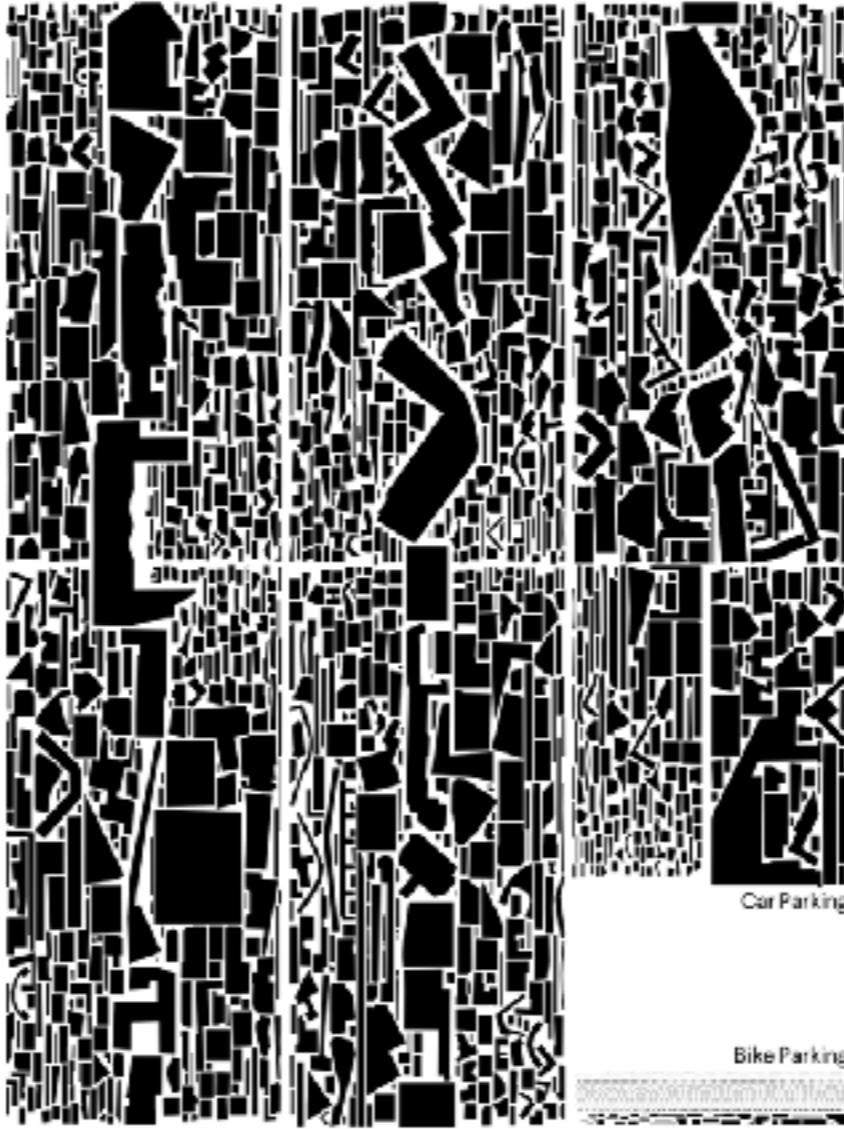


# Huge differences in Car vs Bike space!

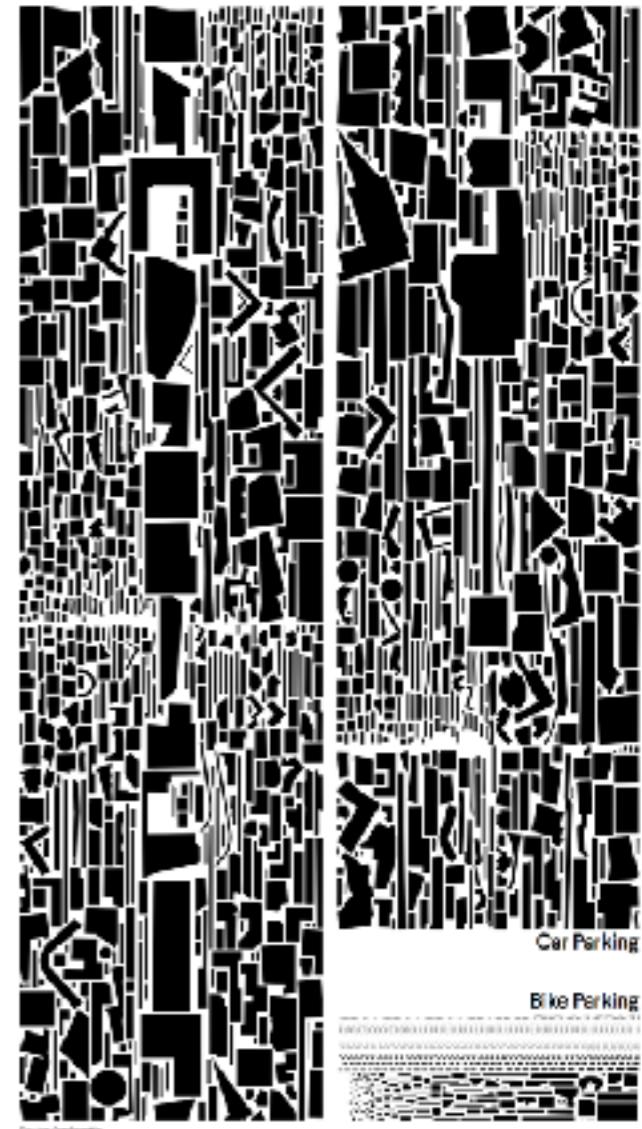
Chicago



Budapest

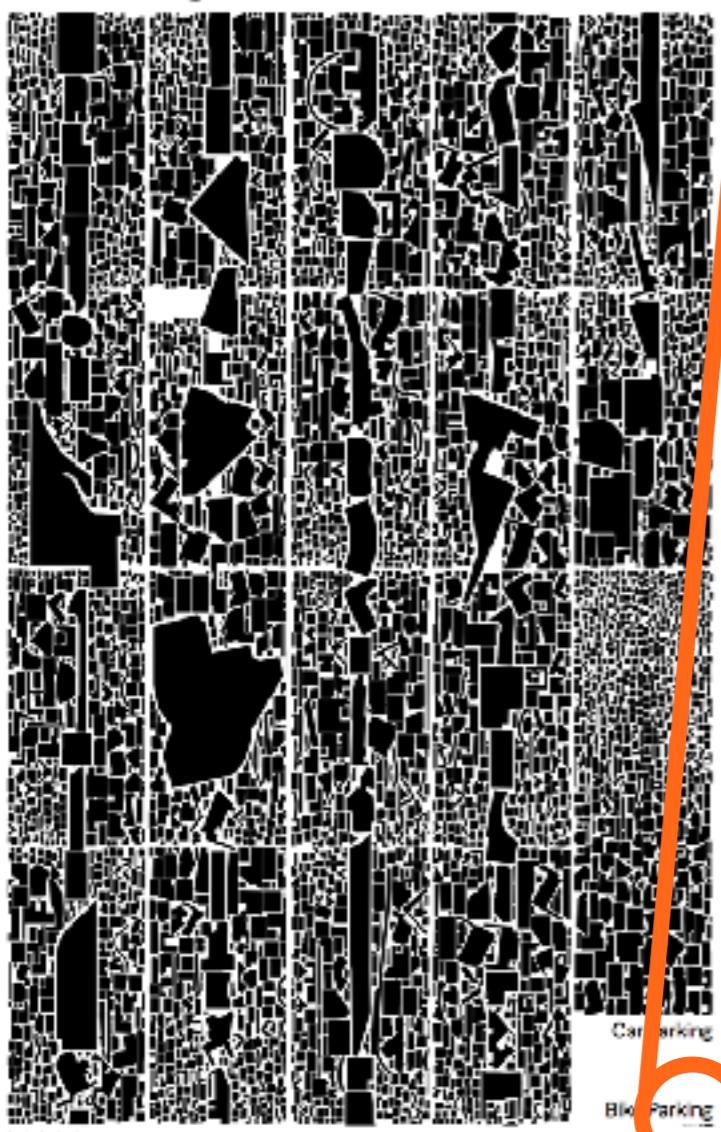


Copenhagen



Huge differences in Ca

Chicago



# Parking

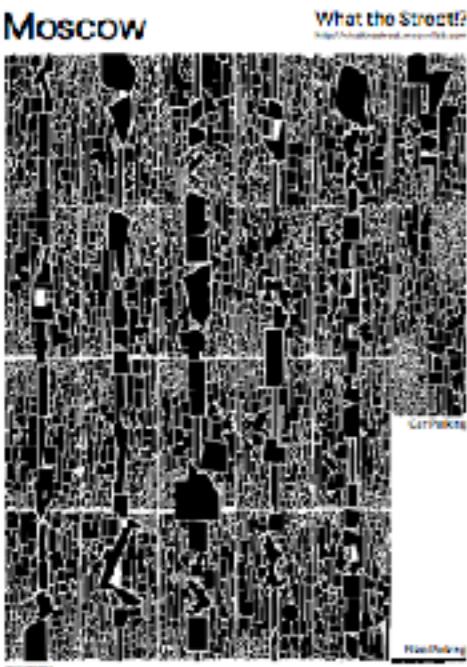
-----

openhagen



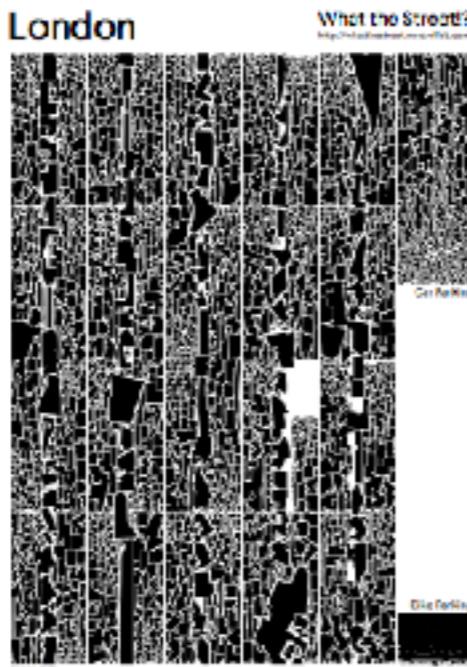
# What the Street!? covers 23 world cities

Moscow



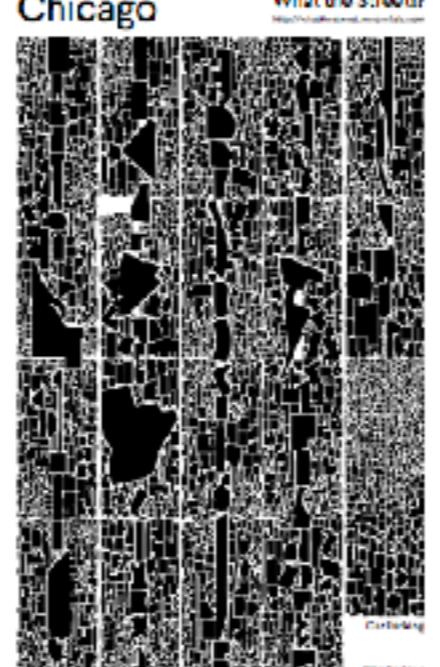
What the Street?  
<http://whatthestreet.mooovel.com/moscow/>

London



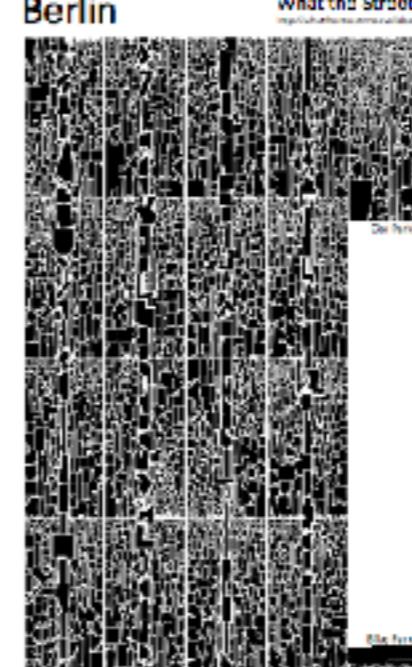
What the Street?  
<http://whatthestreet.mooovel.com/london/>

Chicago



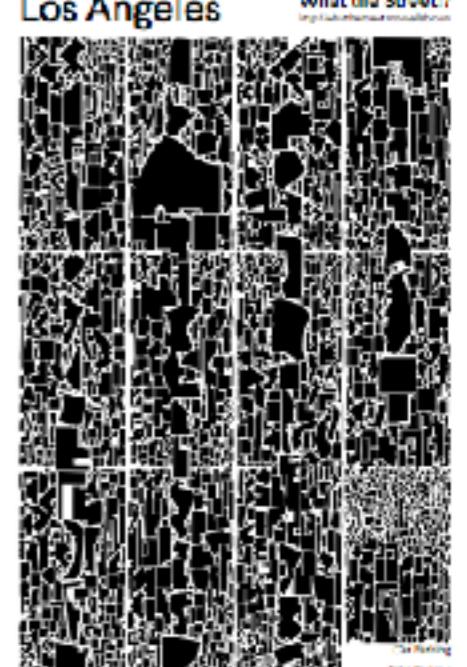
What the Street?  
<http://whatthestreet.mooovel.com/chicago/>

Berlin



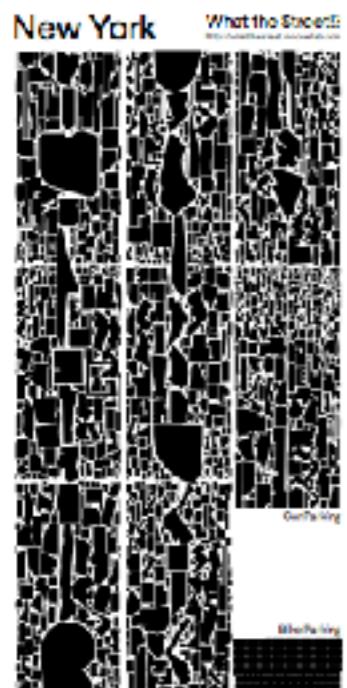
What the Street?  
<http://whatthestreet.mooovel.com/berlin/>

Los Angeles



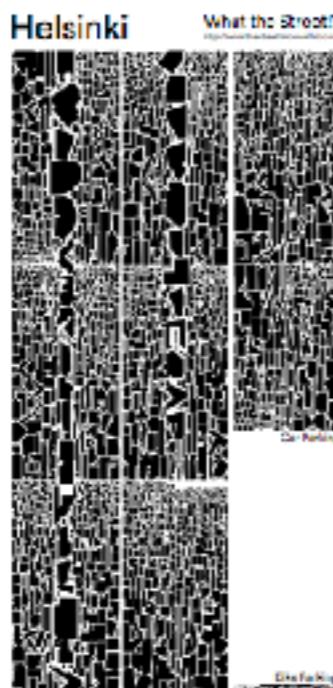
What the Street?  
<http://whatthestreet.mooovel.com/los-angeles/>

New York



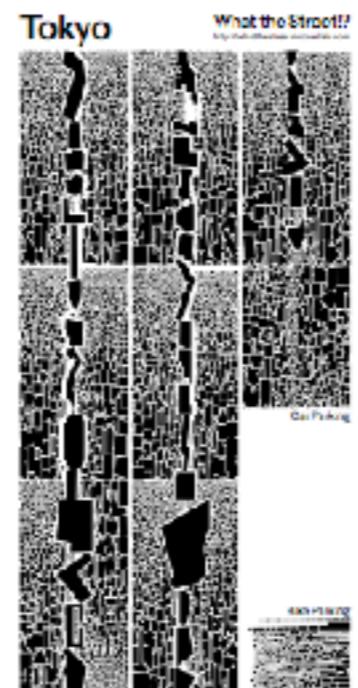
What the Street?  
<http://whatthestreet.mooovel.com/new-york/>

Helsinki



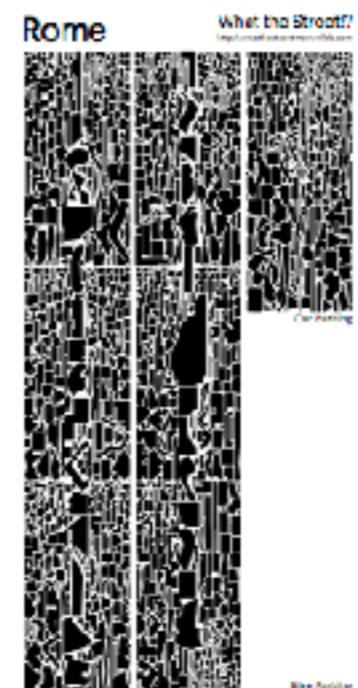
What the Street?  
<http://whatthestreet.mooovel.com/helsinki/>

Tokyo



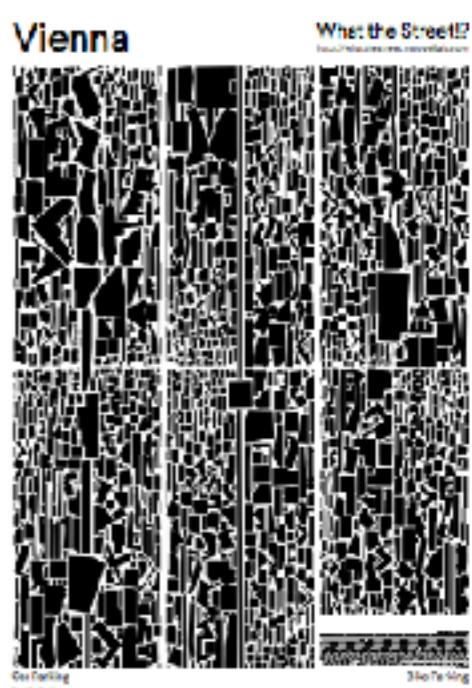
What the Street?  
<http://whatthestreet.mooovel.com/tokyo/>

Rome



What the Street?  
<http://whatthestreet.mooovel.com/rome/>

Vienna



What the Street?  
<http://whatthestreet.mooovel.com/vienna/>

Open-sourced at <https://github.com/moovel/lab-what-the-street>

Cars are used 36 min per day

Cars are not used 1404 min per day

Cars are used 36 min per day

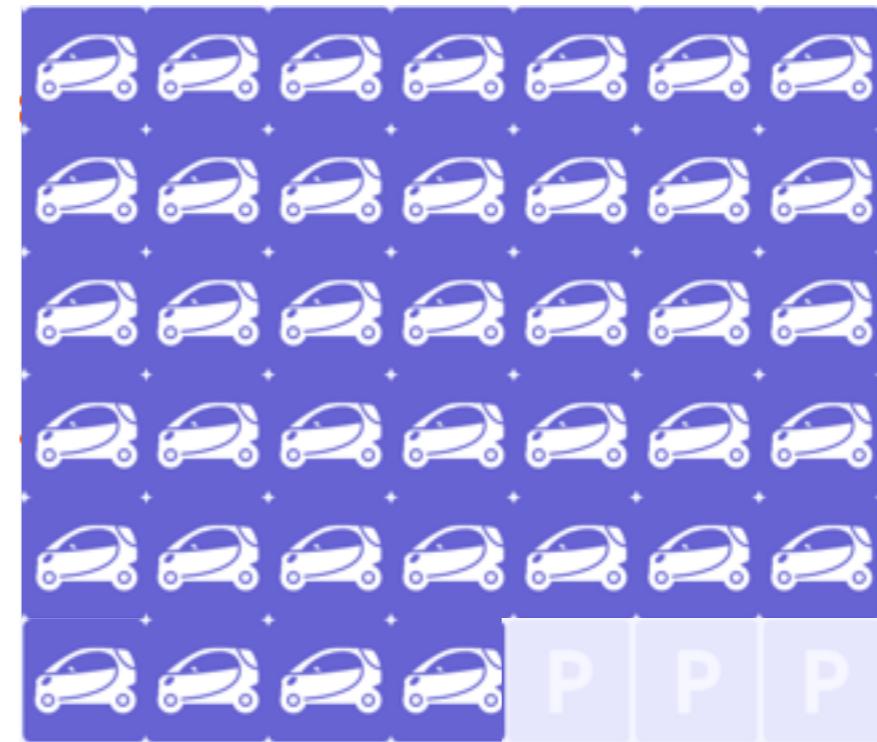
Cars are not used 1404 min per day

A typical snapshot of  
Copenhagen

5,500 cars moving



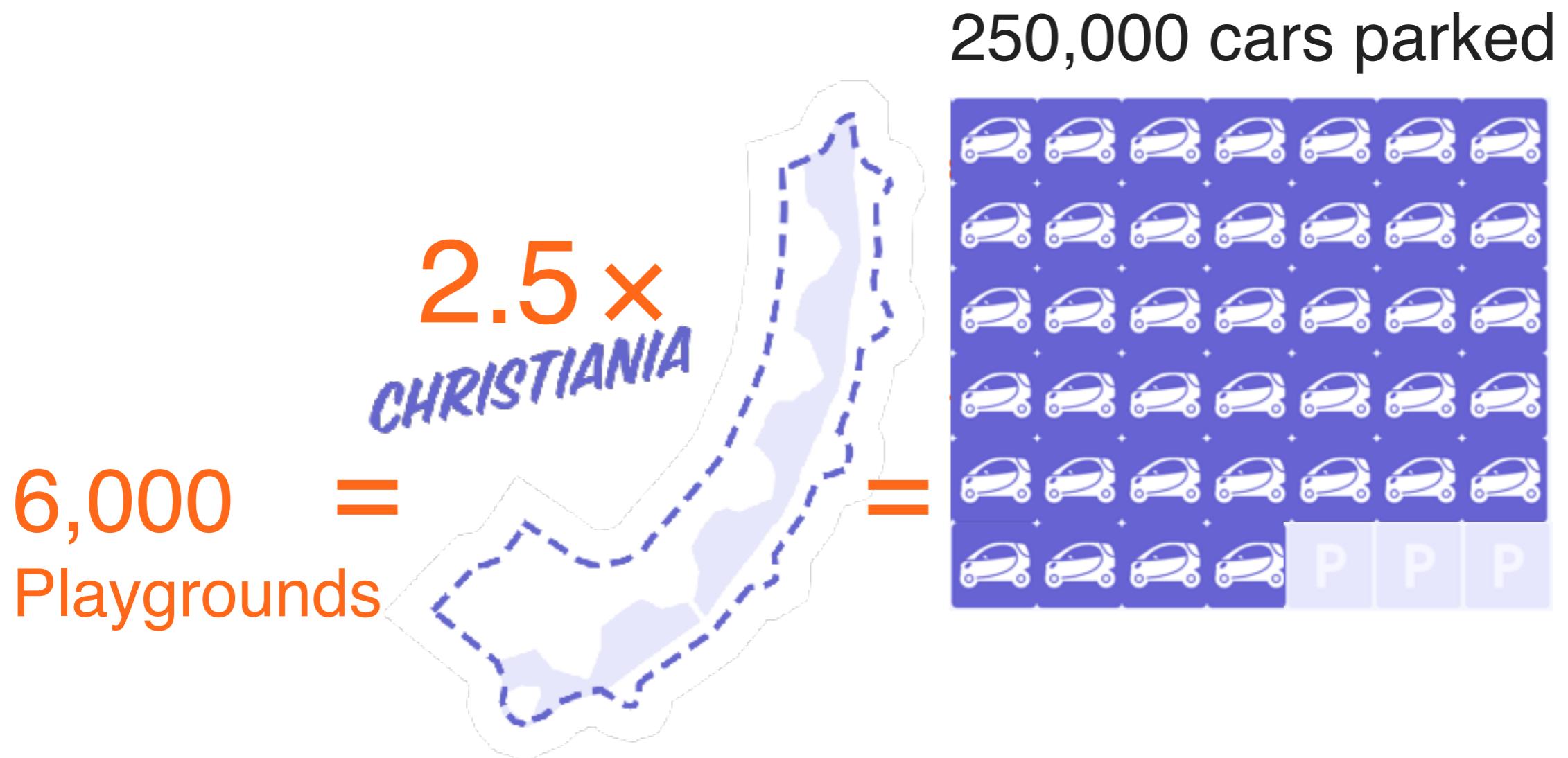
250,000 cars parked



Cars are used 36 min per day

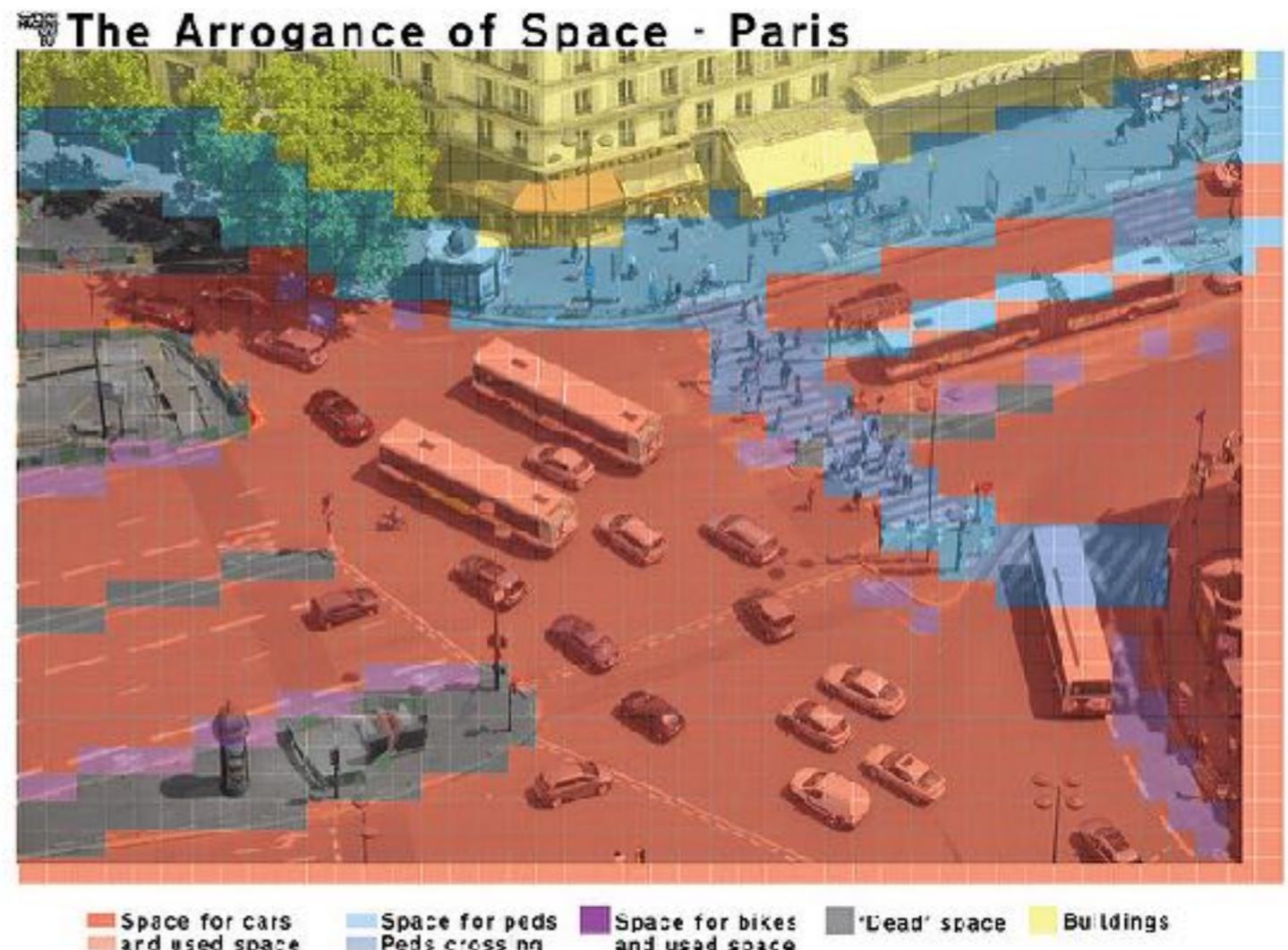
Cars are not used 1404 min per day

A typical snapshot of  
Copenhagen



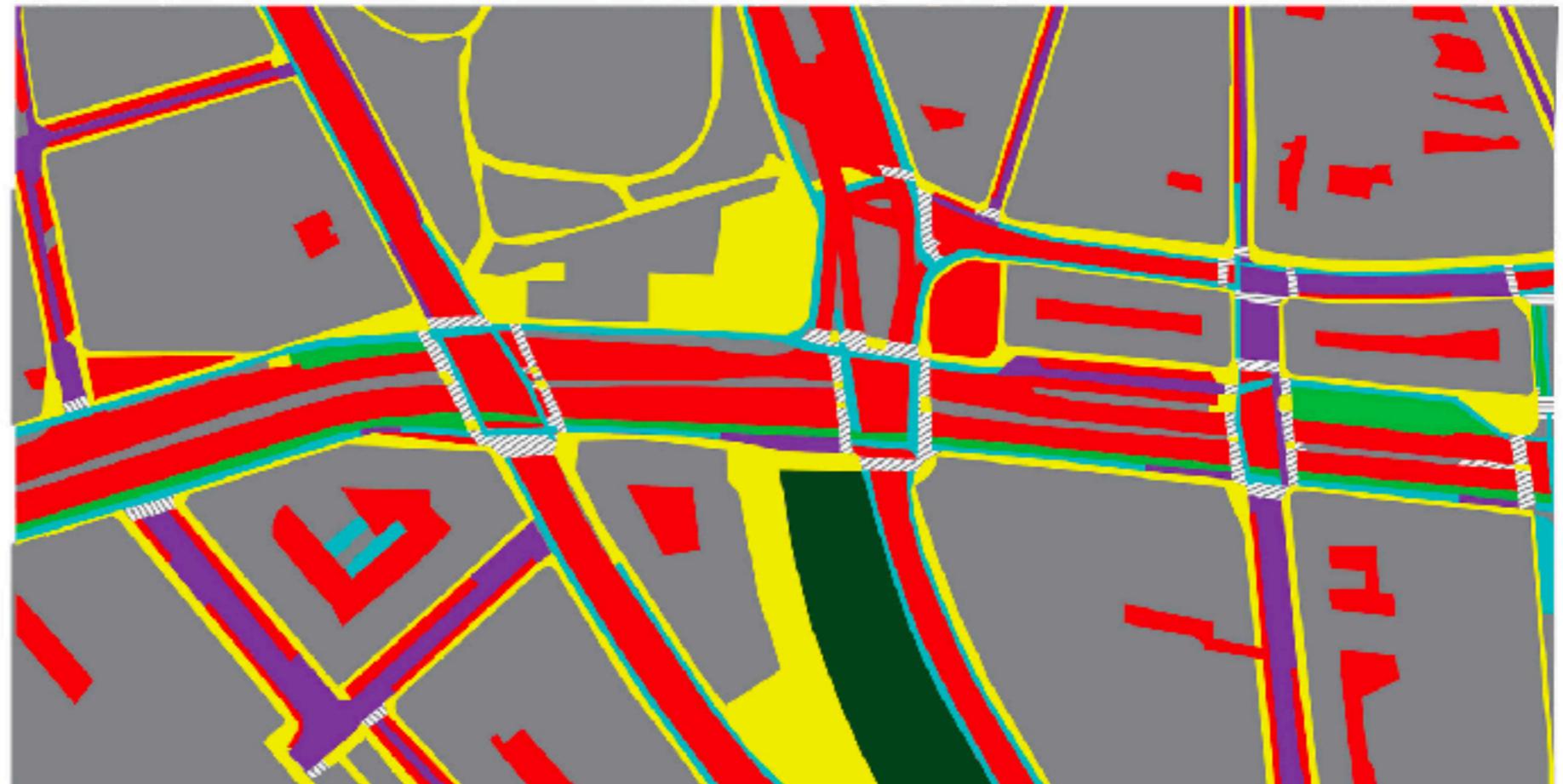
# The arrogance of space

Space is not distributed fairly between modes of transportation



# The arrogance of space

Case study:  
Copenhagen



Arrogance of Space - Copenhagen. A Section of Hans Christian Andersen Boulevard

■ Motorized Vehicles ■ Bikes ■ Pedestrians ■ Shared Space ■ Bus ■ Non Transport Space ■ Zebra Crossing ■ Trains

And this is the  
best place in the  
world for bikes!

Modal Share for Copenhageners Commuting to Work/Education



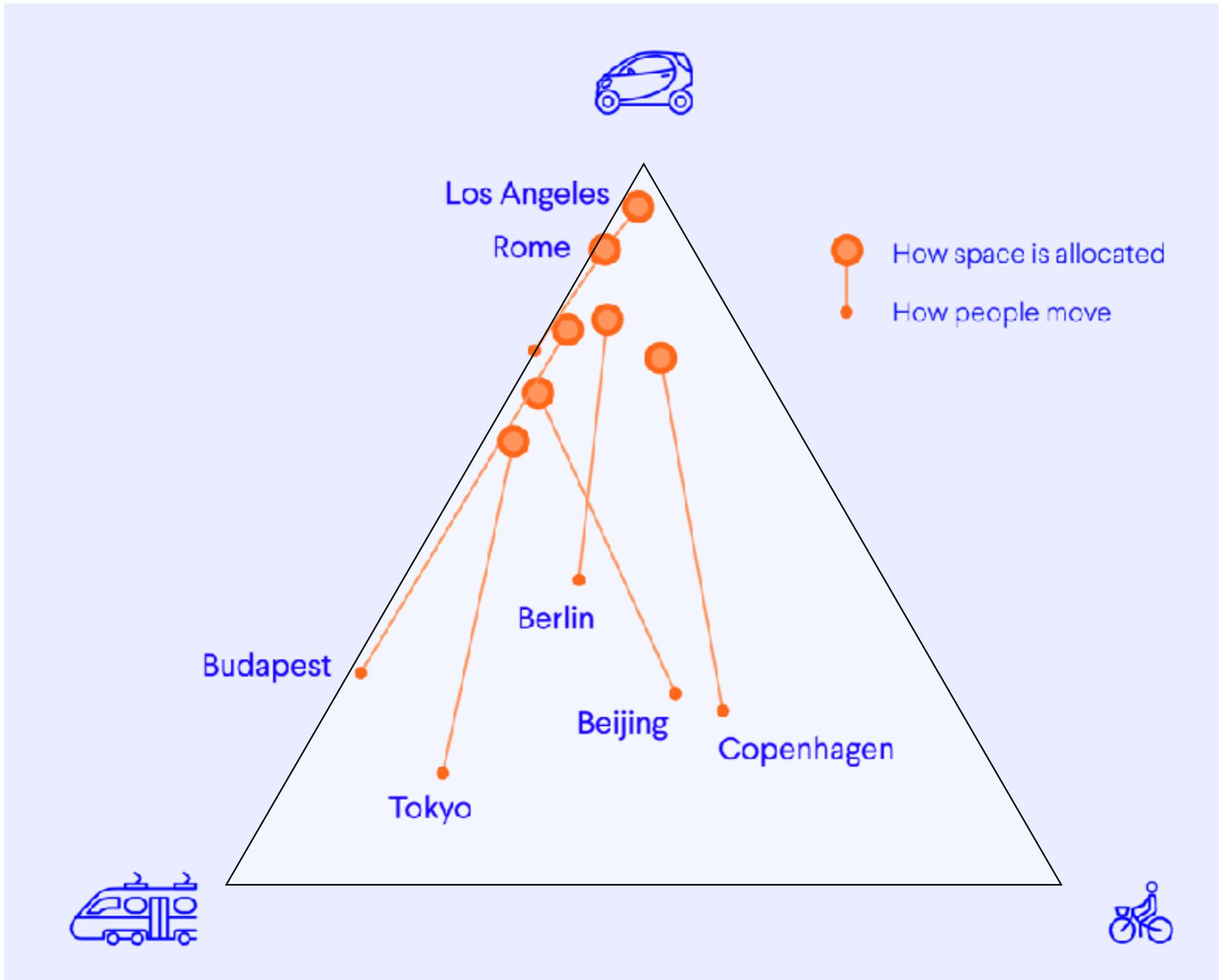
Allocation of Transport Space in Copenhagen



COPENHAGEN  
IZE  
EU

Gossling, Schroder, Spath and Freytag, Transport Reviews 36, 659-679 (2016)  
<http://www.copenhagenize.com/2017/05/arrogance-of-space-copenhagen-hans.html>

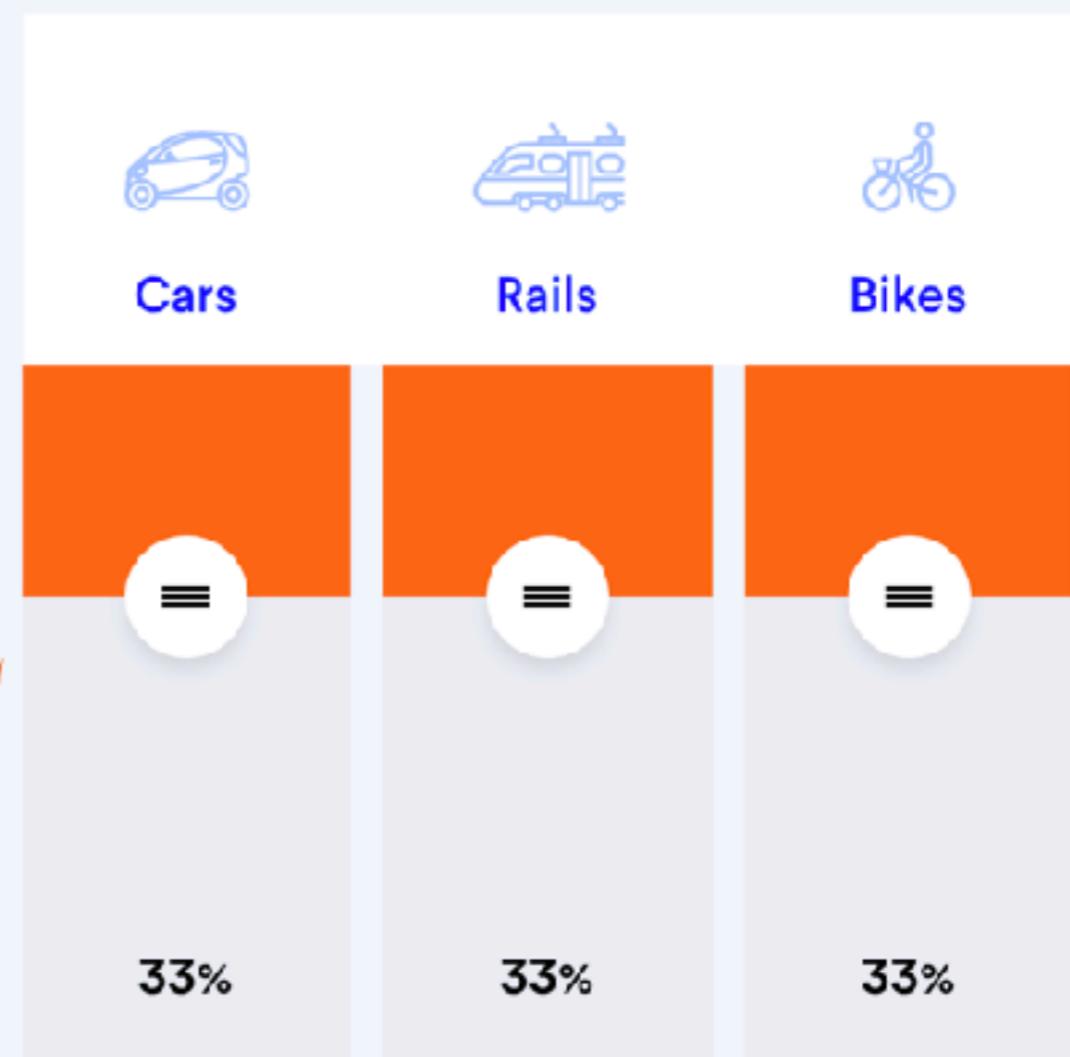
# The mobility triangle shows the arrogance of space in two data points



## Who owns Copenhagen ? ↓

City space is limited! What do you think, how much space is allocated to the different ways of moving through the city?

TAKE YOUR  
**BEST GUESS**  
BY ADJUSTING THE  
SLIDERS



Get Started

# What the Street!? is interactive

 Home  Search Streets

No Parking Selected

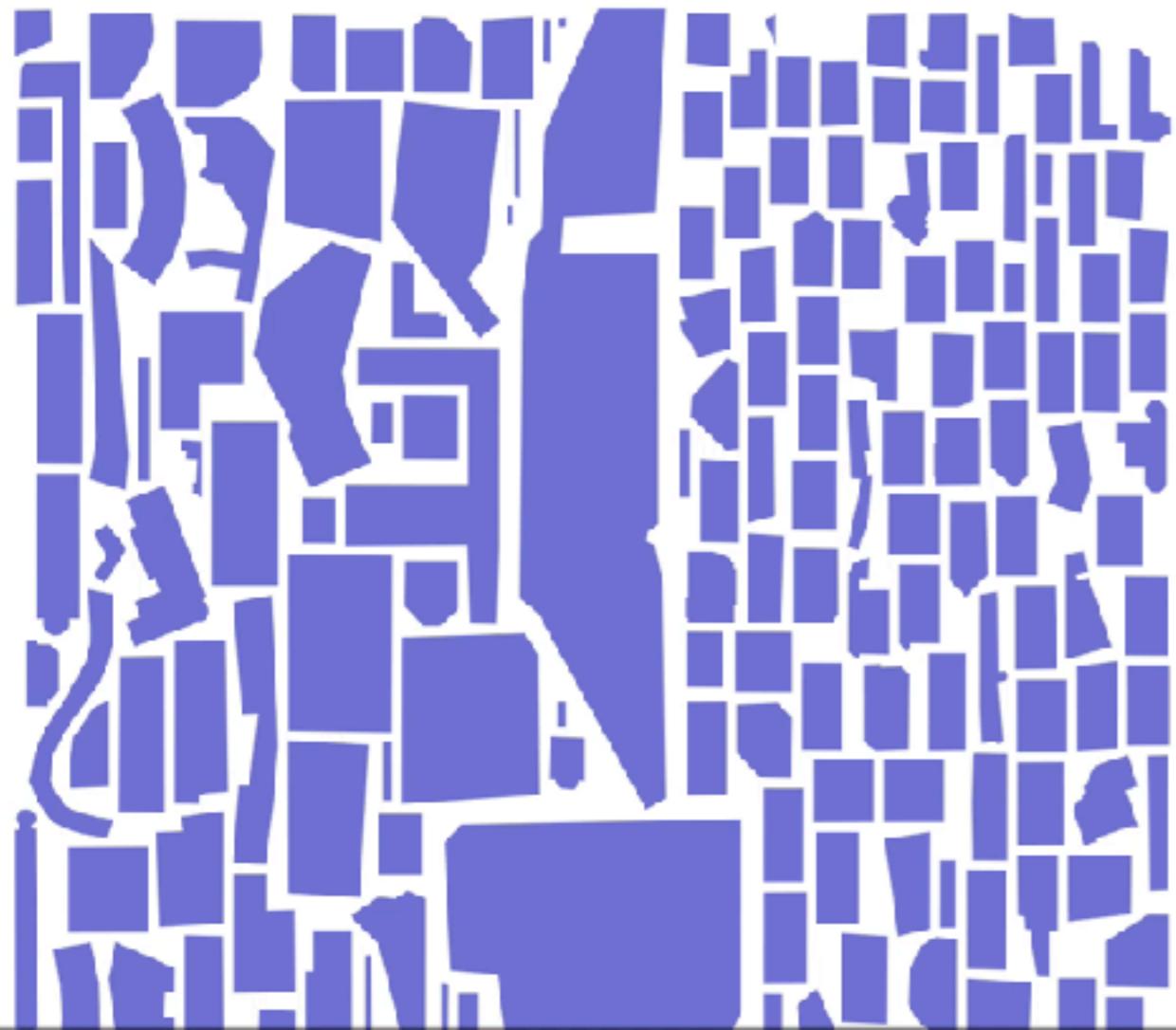


0.0 m<sup>2</sup>



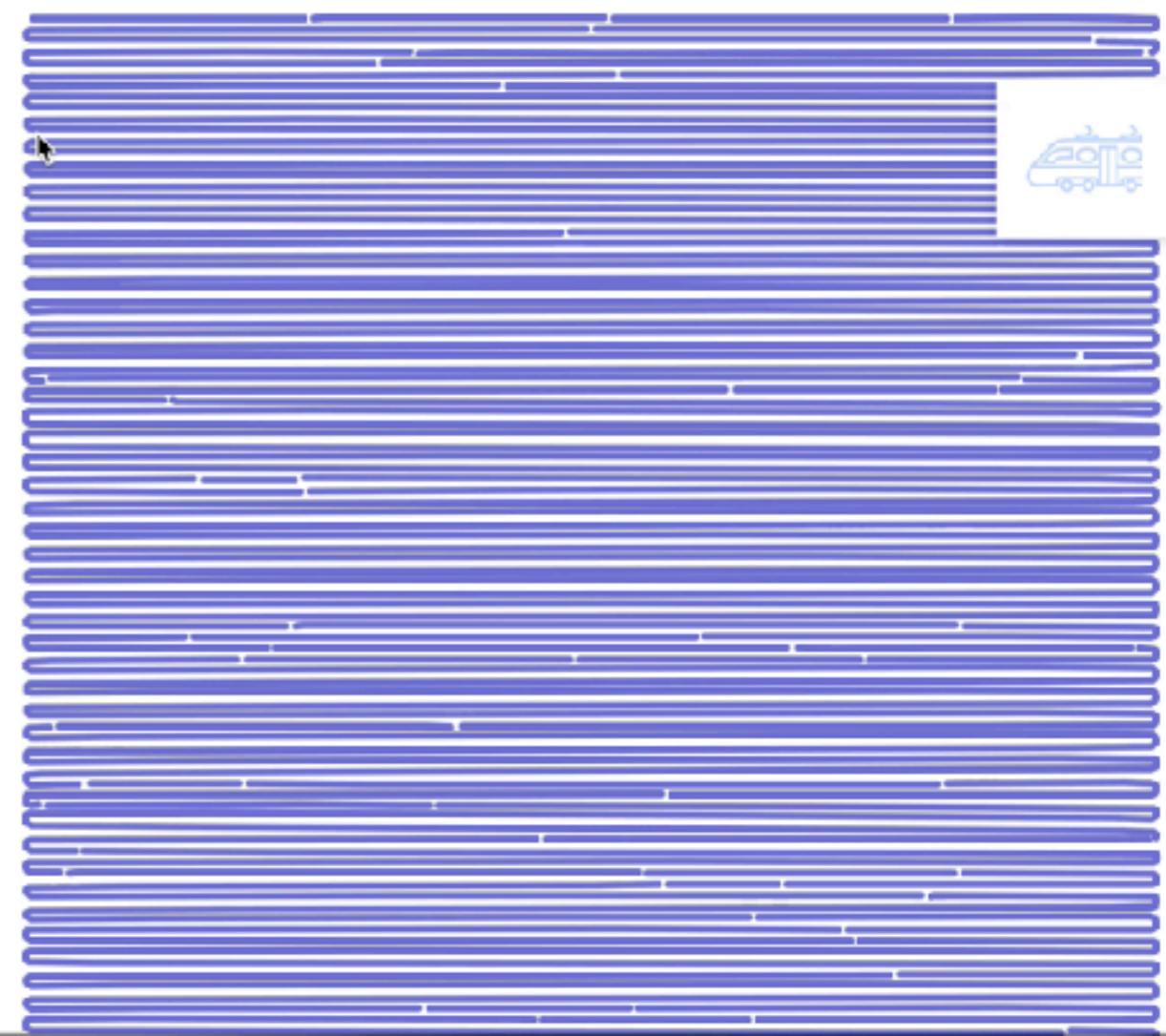
No Lane Selected

## Car Parking



↑ Scroll to next →

## Car Lanes

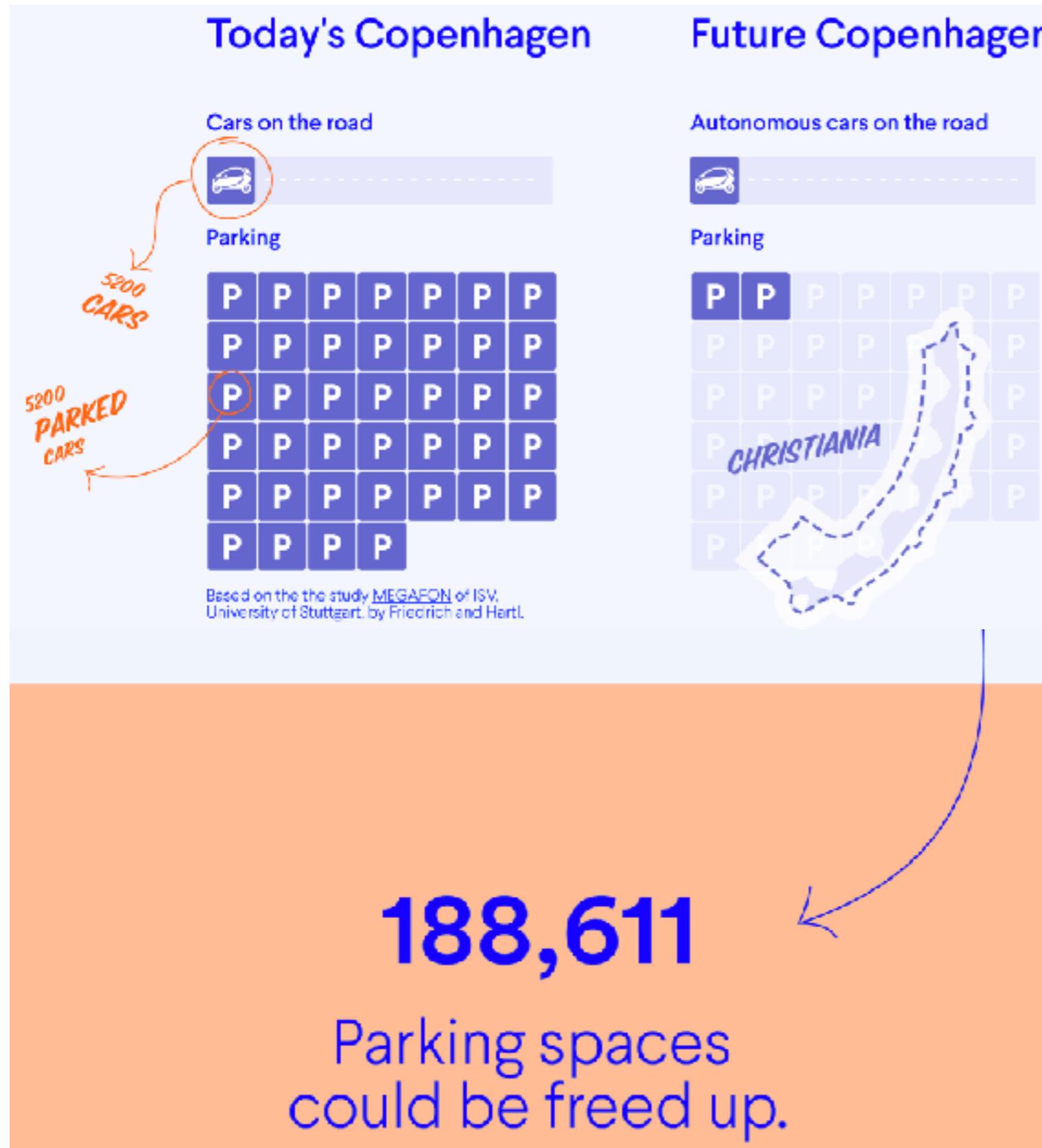


How can we get back the space?

# 10% of self-driving cars can deliver same mobility



# 93% of parking spaces could be saved by autonomous, shared vehicles



Friedrich & Hartl, Univ. Stuttgart (2016)

# Autonomous, shared cars sound nice, but are NOT the ultimate solution



# Autonomous, shared cars sound nice, but are NOT the ultimate solution



We know the solution. It is simple geometry.

Euclid (300 BC)

Harms and Kansen, Netherlands Institute for Transport Policy Analysis (2017)  
Szell, Urban Planning 3, 1-20 (2018)



Thx to OpenStreetMap for all the data!

# Cheers!



Michael Szell  
ITU Copenhagen  
[@mszll](https://twitter.com/mszll)