

# Visual exploration of urban mobility space inequality with What the Street!?

---

CID Growth Lab, Harvard University, July, 2017

Michael Szell

@mszll

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



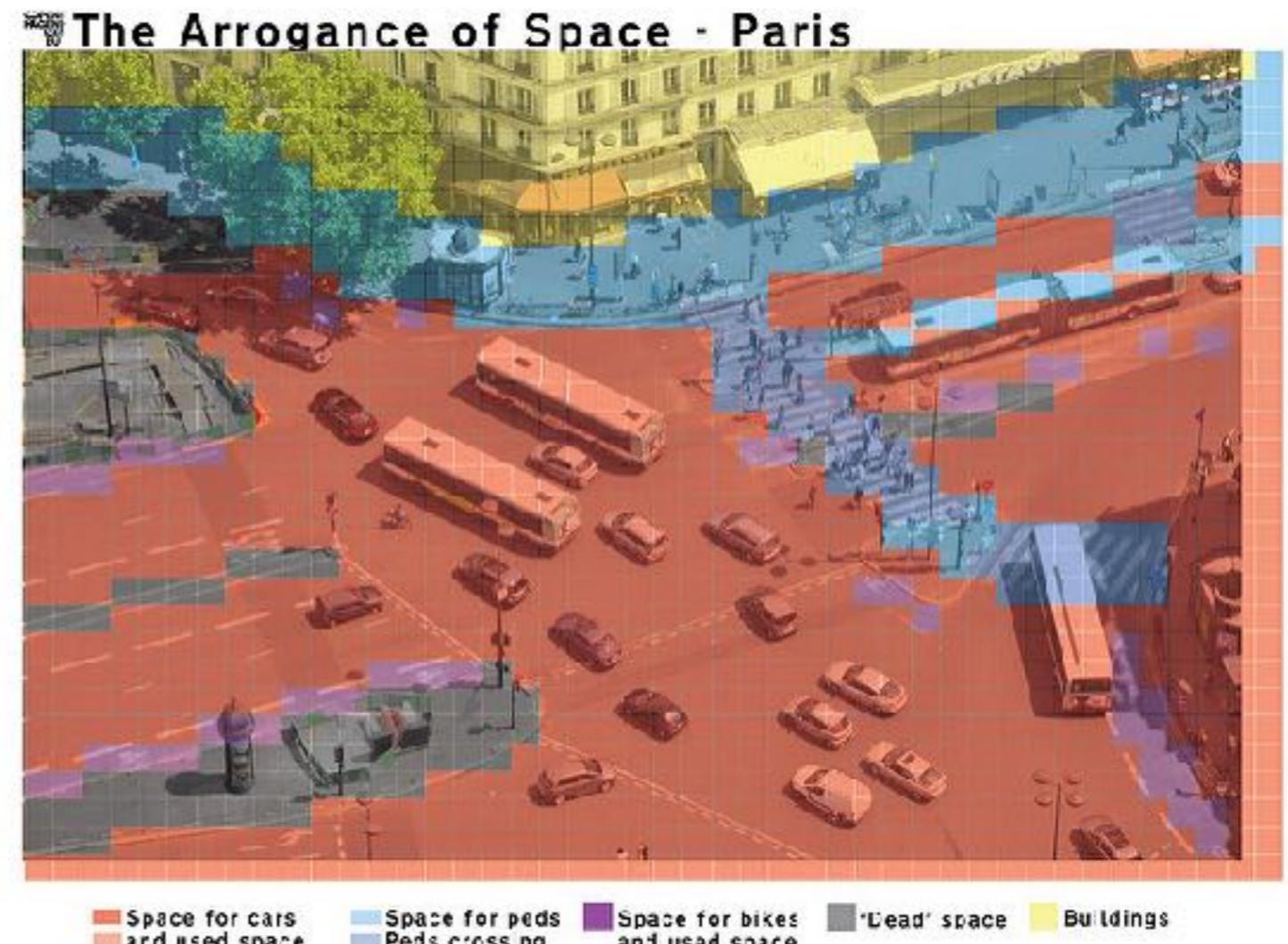
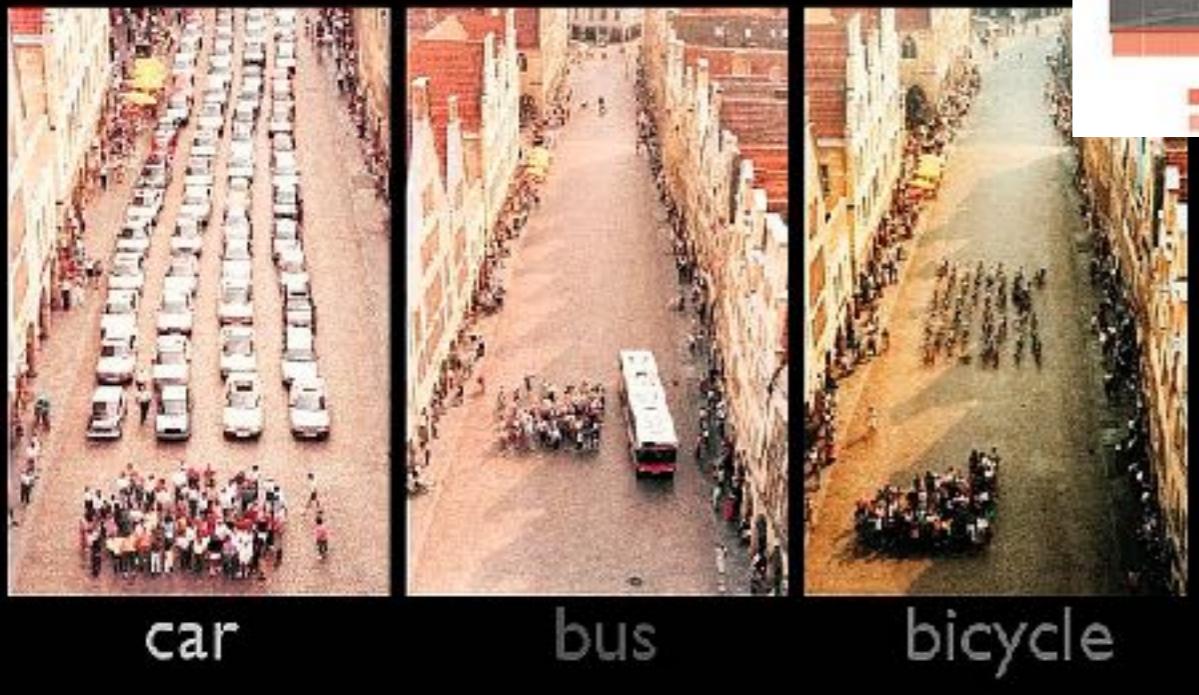
[whatthestreet.moovellab.com](http://whatthestreet.moovellab.com)



# The arrogance of space

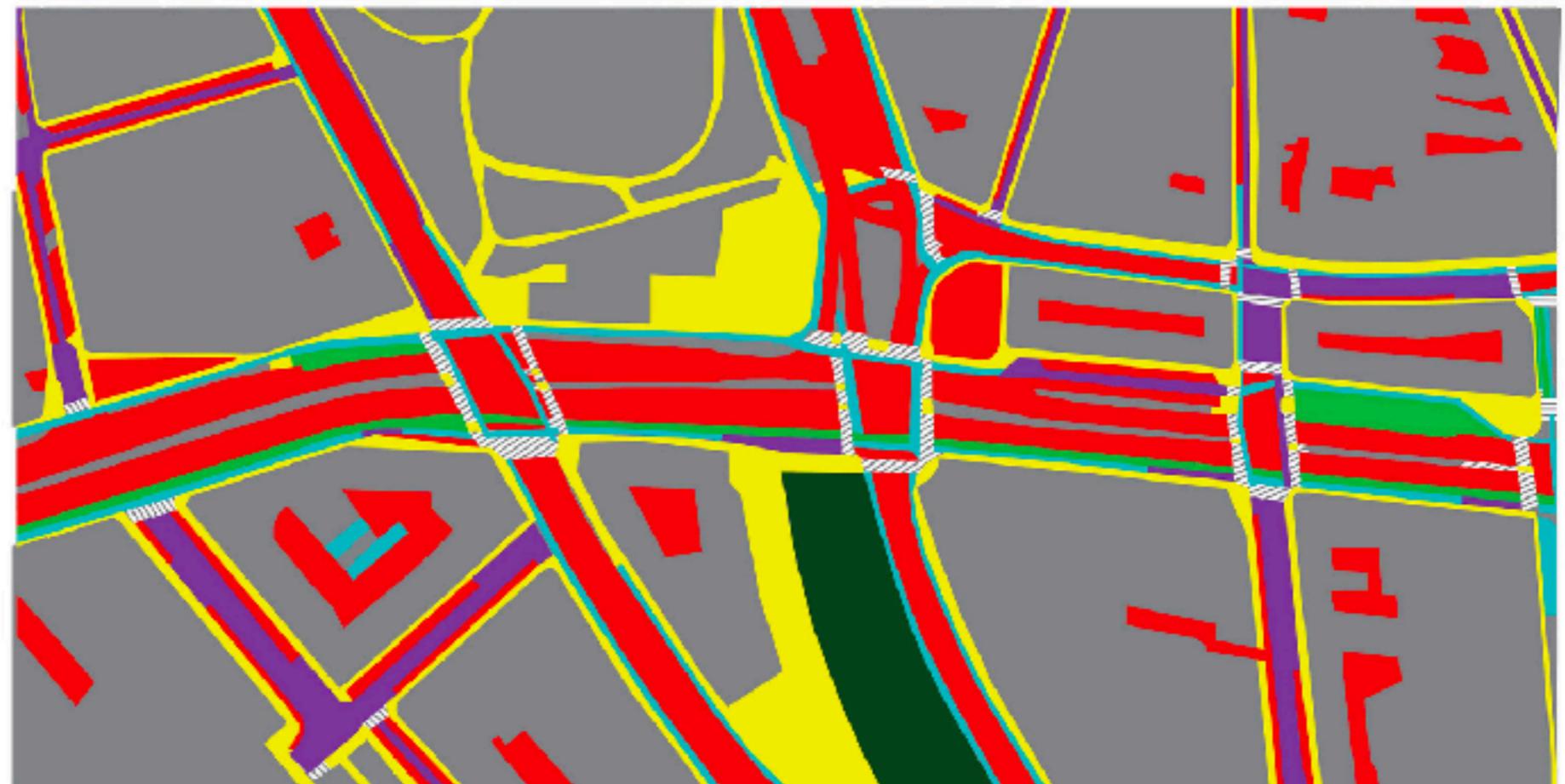
Space is not distributed fairly between modes of transportation

**space required  
to transport 60 people**



# 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



Really!

Cars are used 36 min per day

Cars are not used 1404 min per day

Cars are used 36 min per day

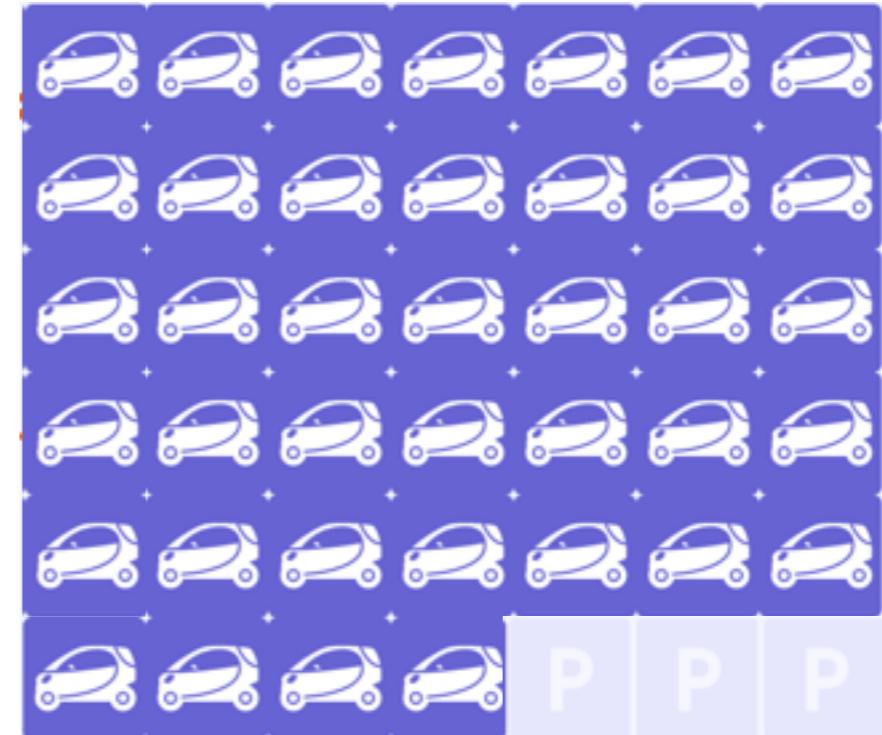
Cars are not used 1404 min per day

A typical snapshot of Berlin

30,000 cars moving



1,200,000 cars parked

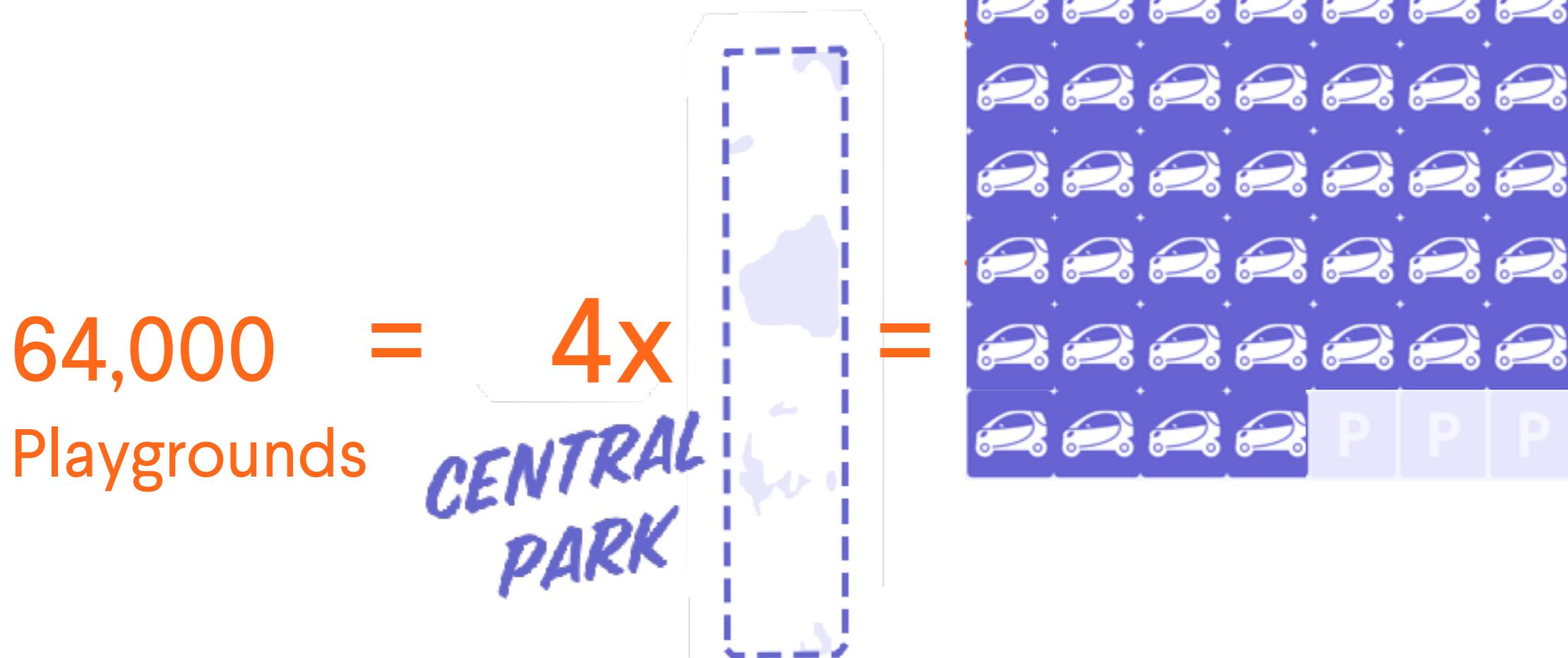


Cars are used 36 min per day

Cars are not used 1404 min per day

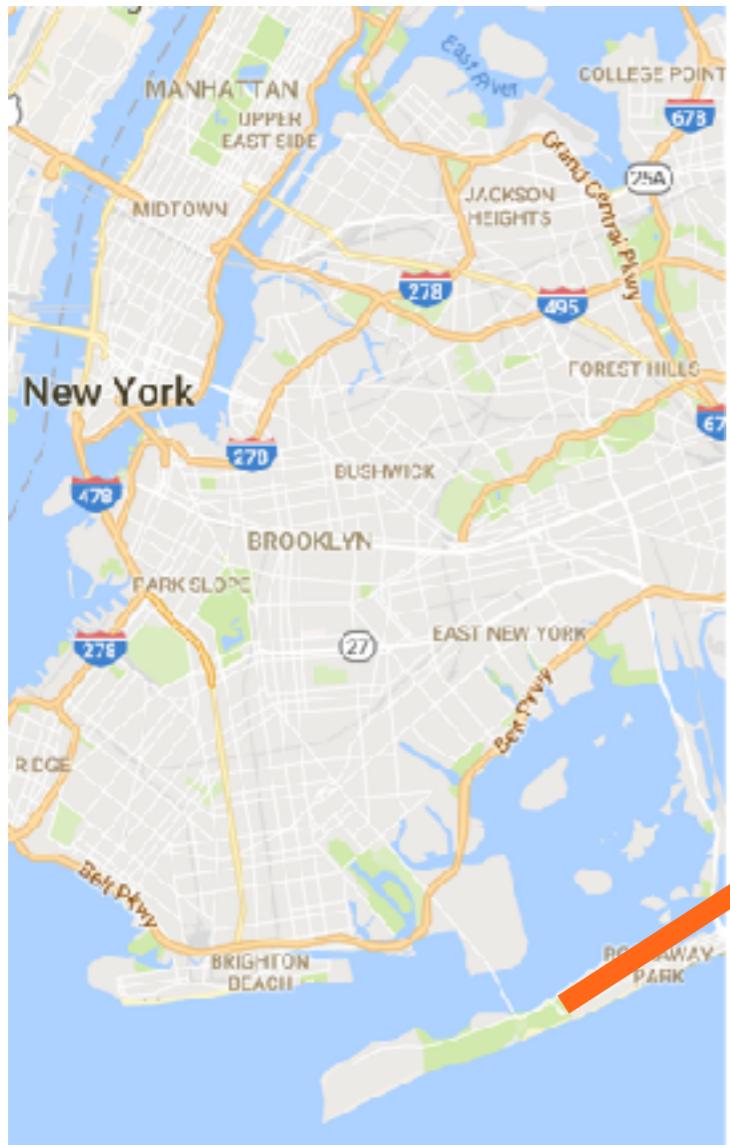
A typical snapshot of Berlin

1,200,000 cars parked



How does all of this space look like?

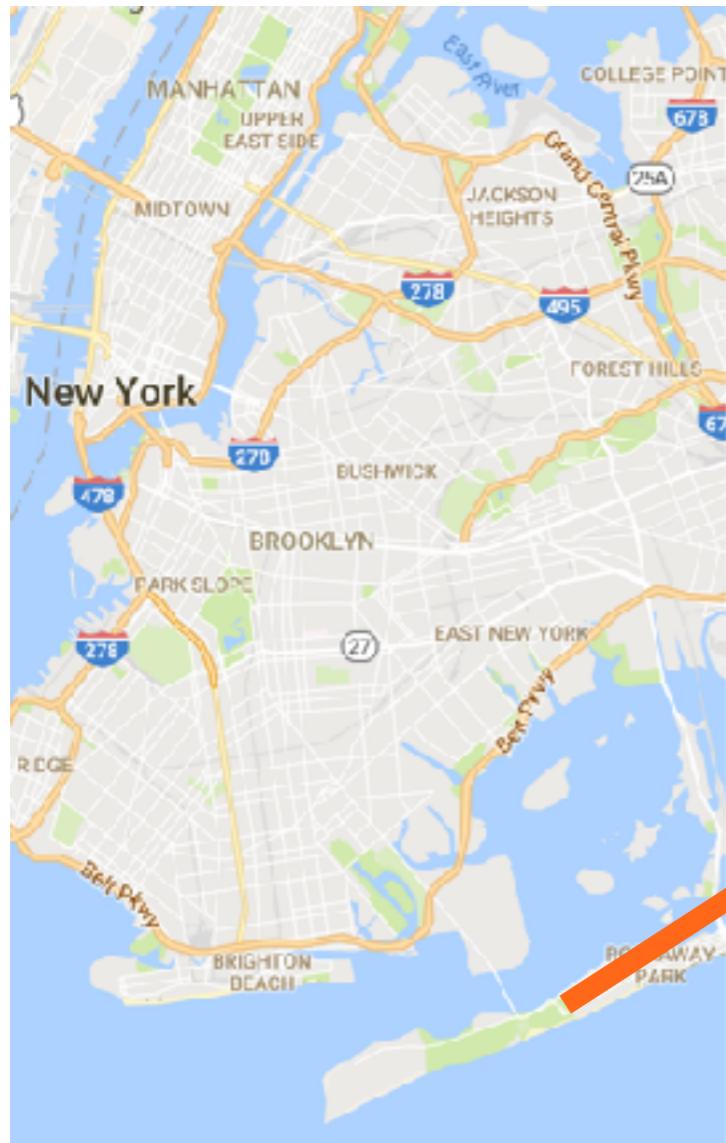
How can we get it back?

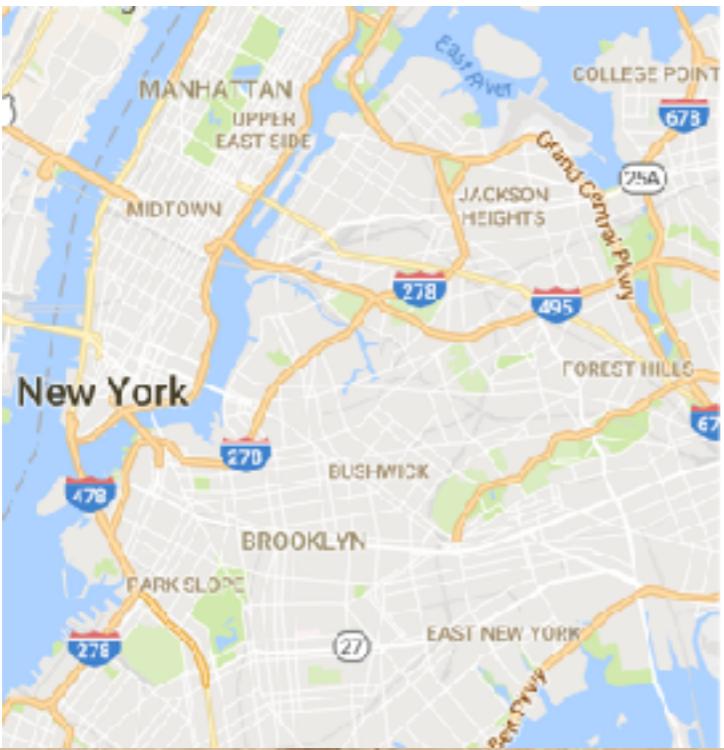


What a lovely green..

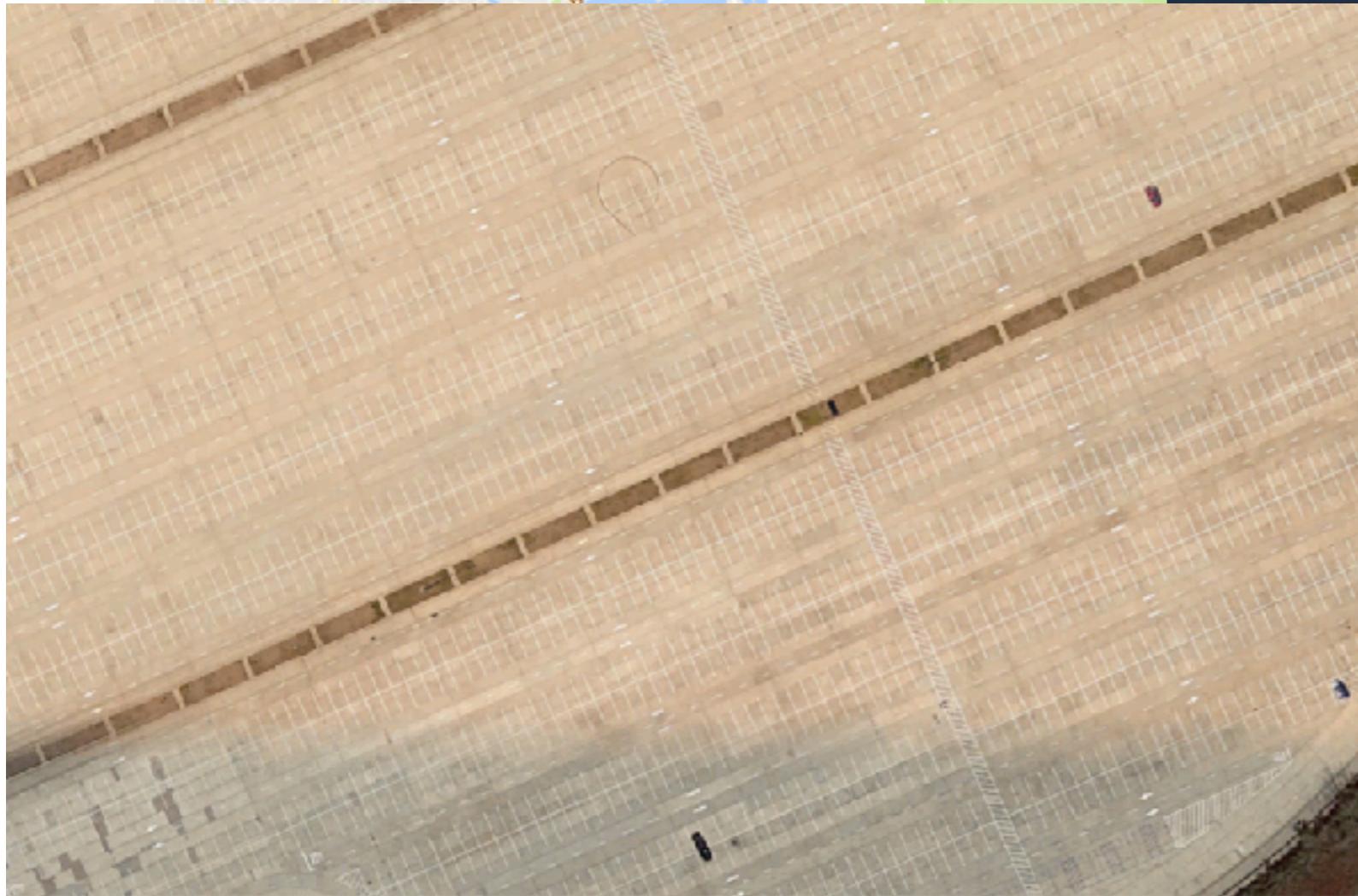
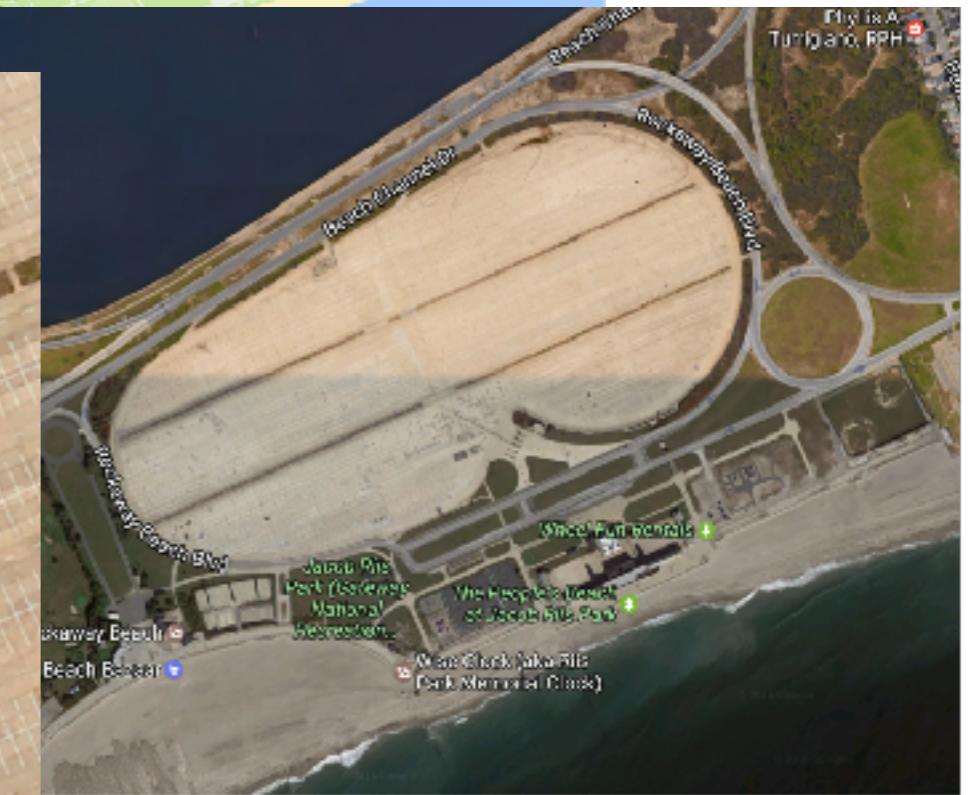
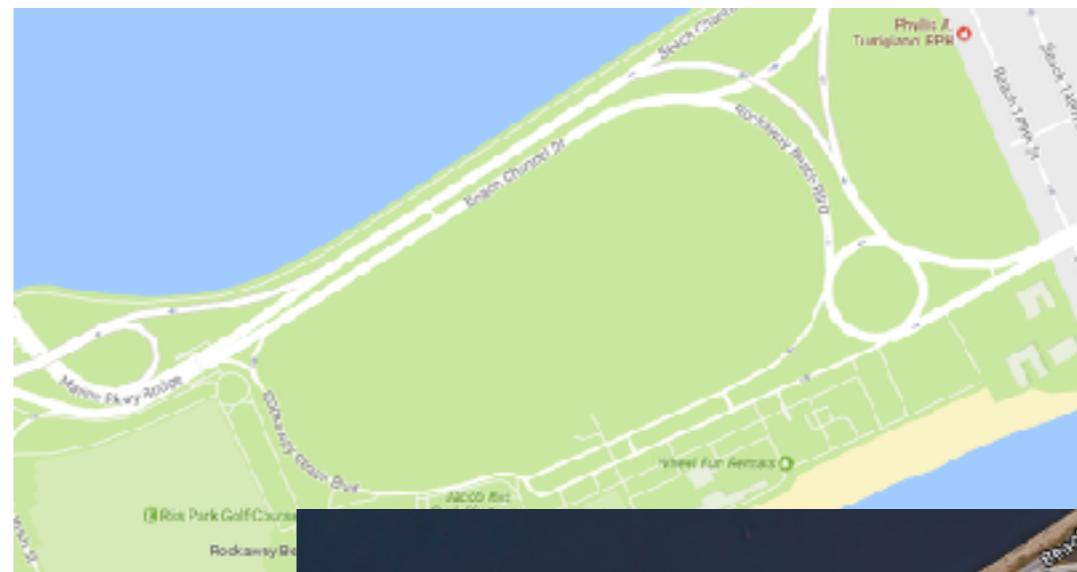


# What a lovely green..

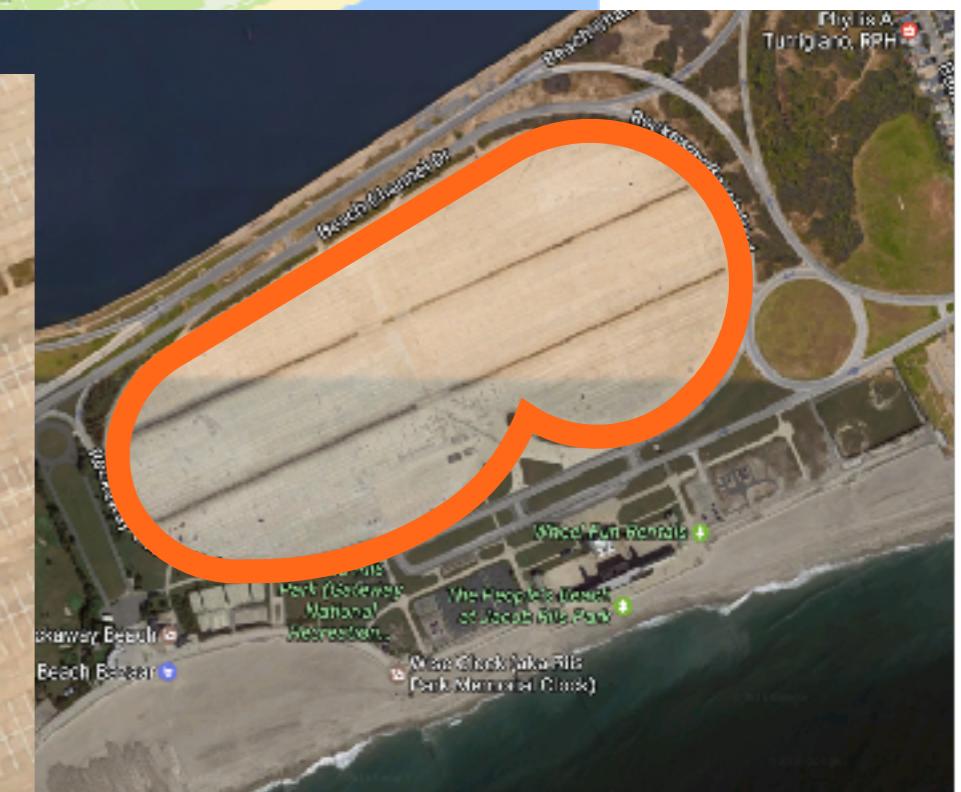
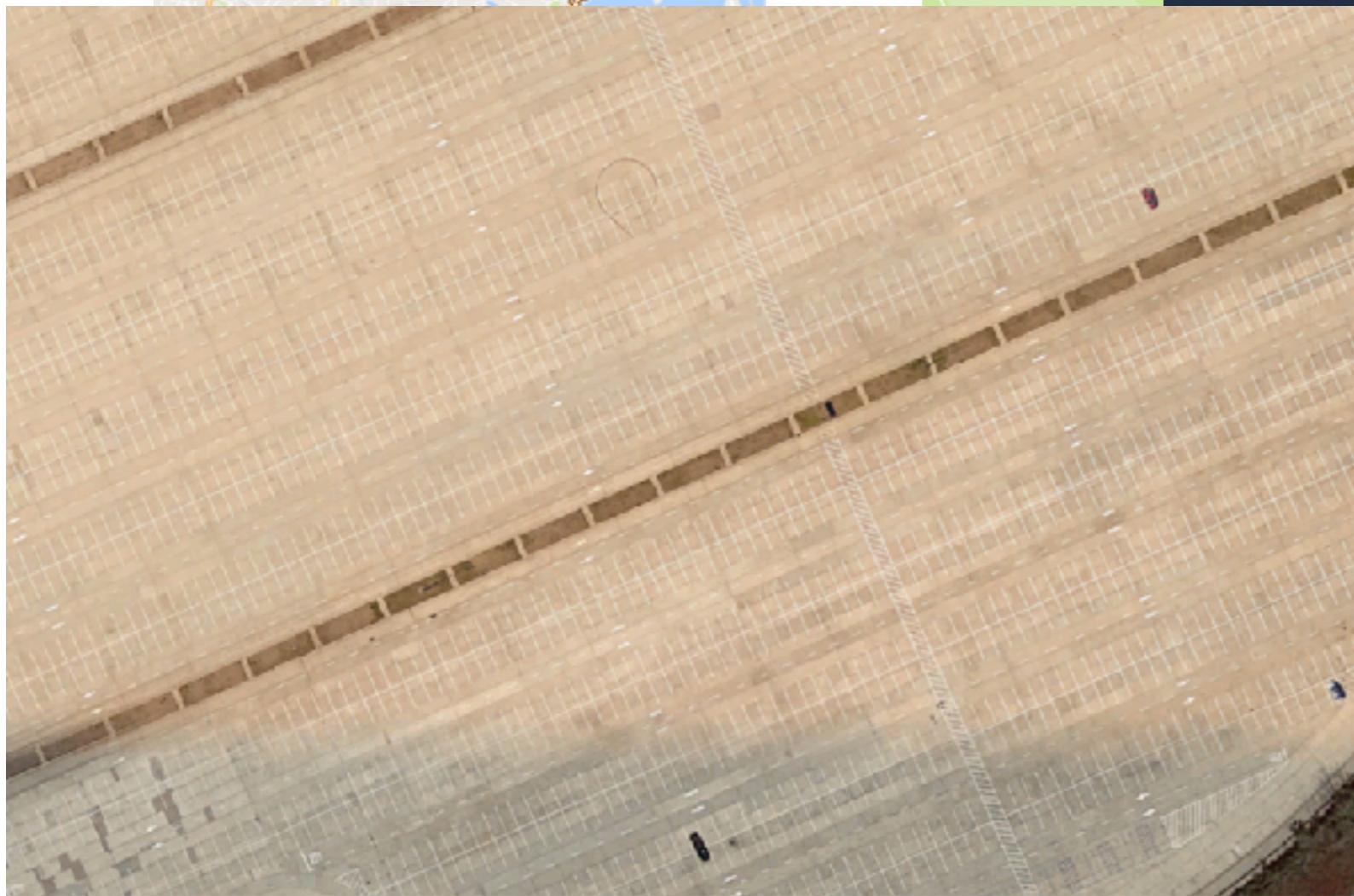
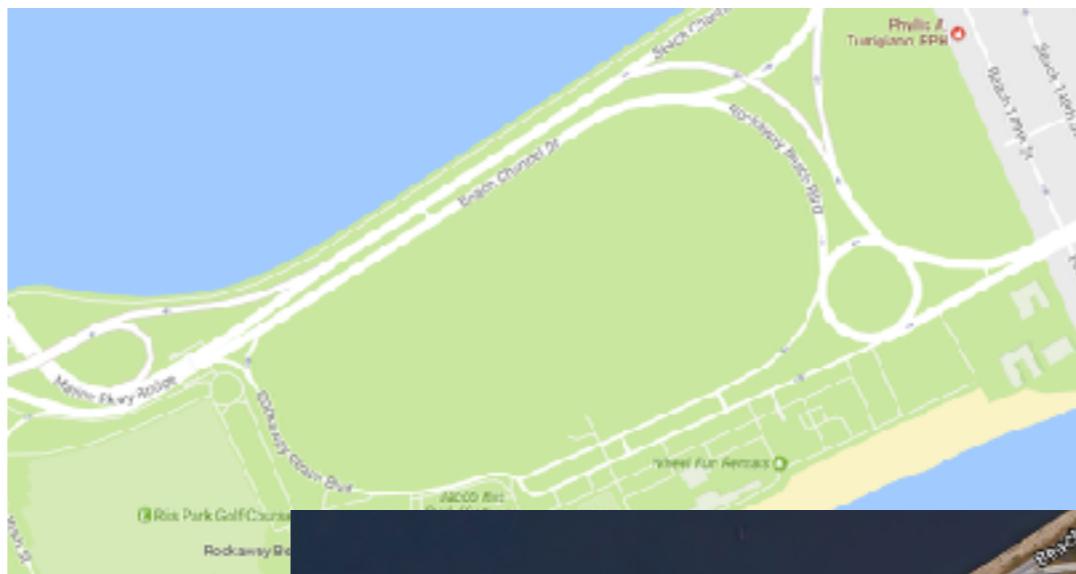




What a ~~lovely~~ green.. MONSTER

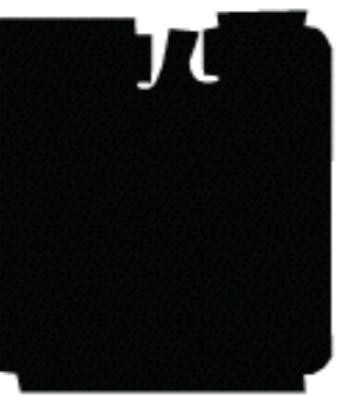


800m x 500m

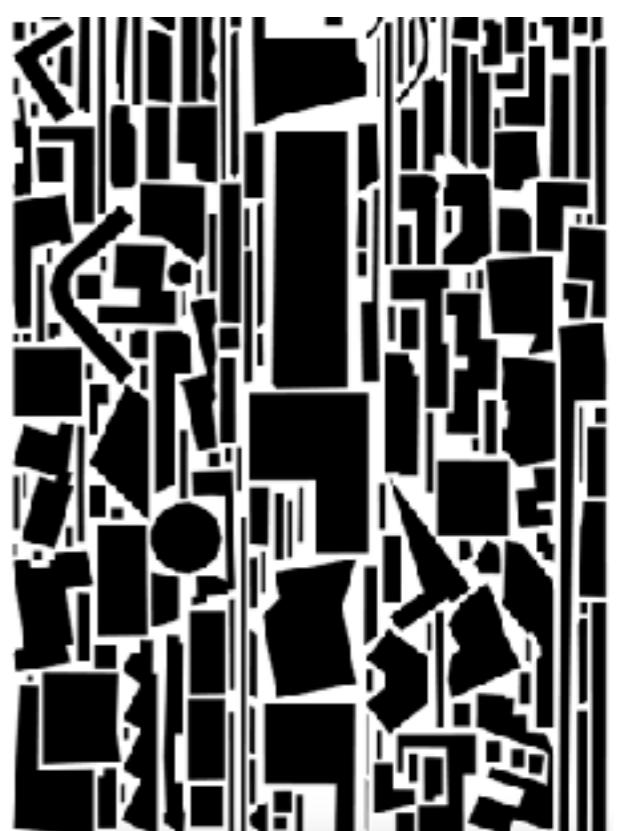
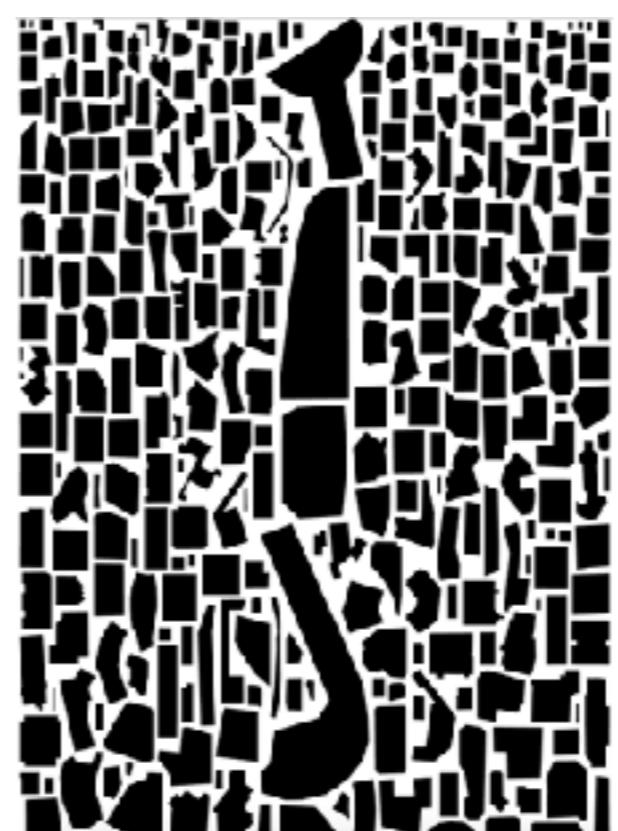


Use polygon packing to visualize ALL parking spaces [SVGnest.com](http://SVGnest.com)





# Cities have unique patterns



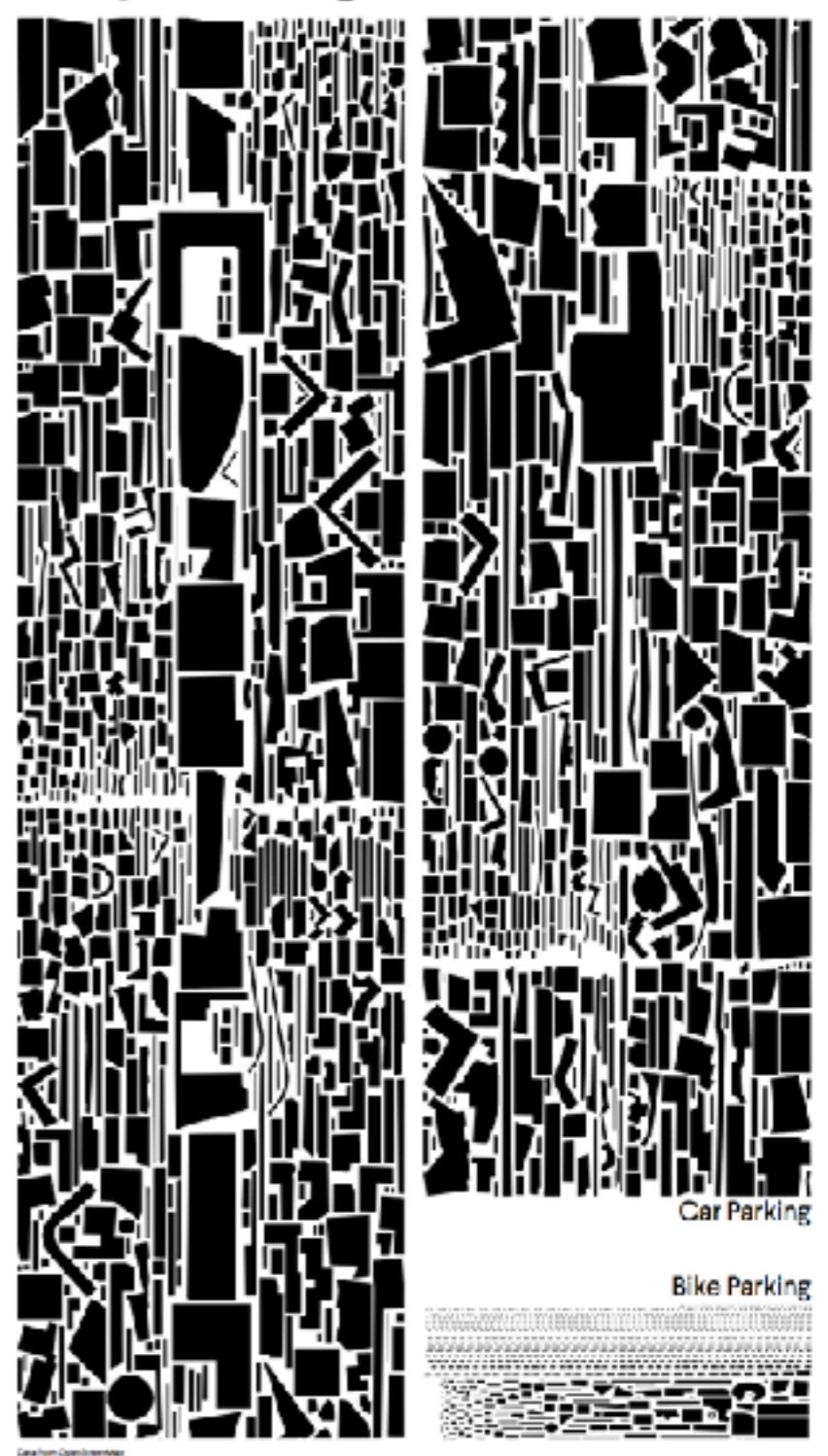
Porta, Crucitti, Latora, Physica A 369: 853-866 (2006)  
Barthelemy, Flammini, PRL 100:138702 (2008)

# Cities have unique distributions

Chicago

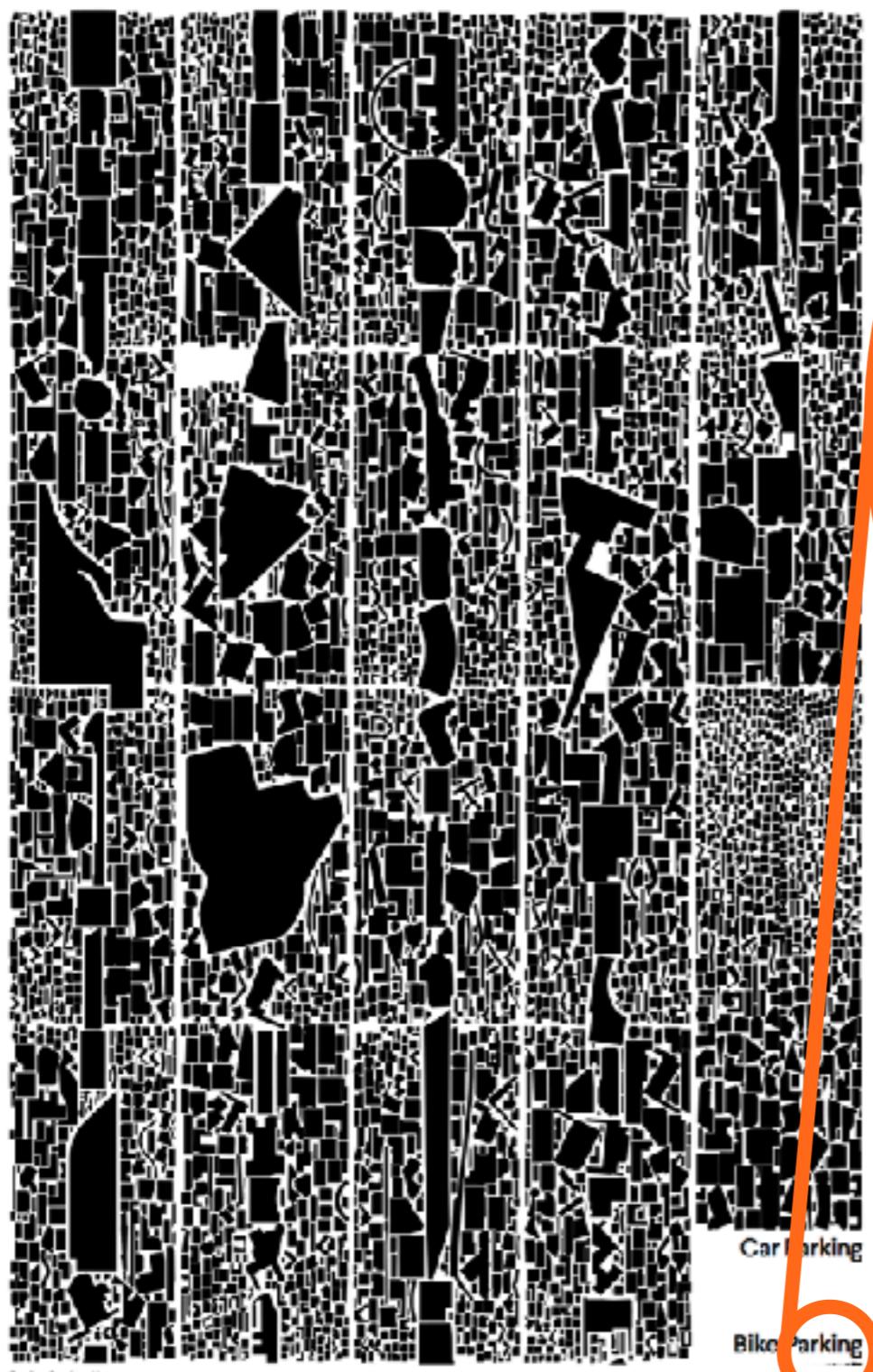


Copenhagen



# Cities have unique distributions

Chicago



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

Parking



Data from OpenStreetMap

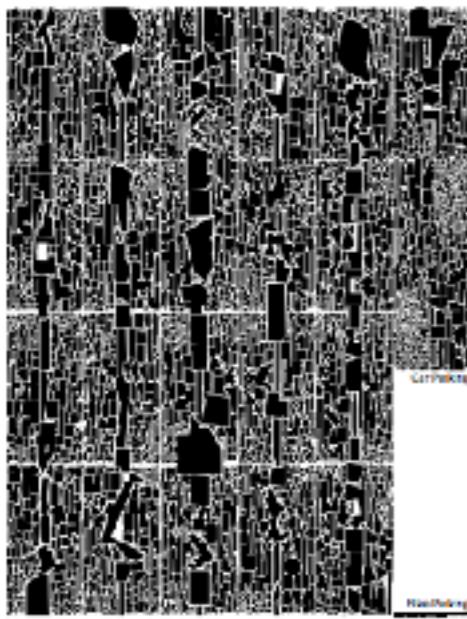
What the Street?  
<http://whatthestreet.mocvllab.com>



Bike Parking

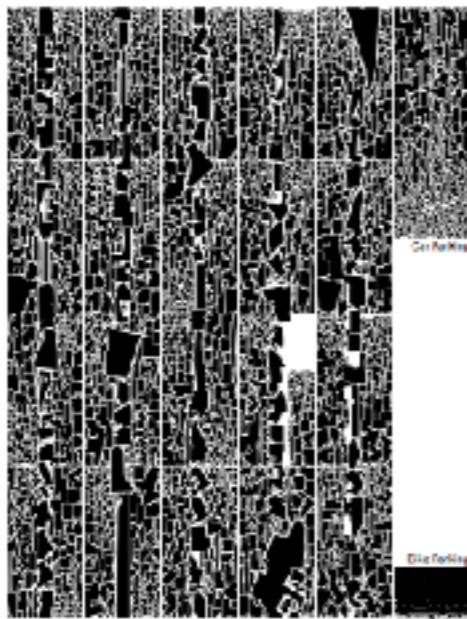
# What the Street!? covers 23 world cities

Moscow



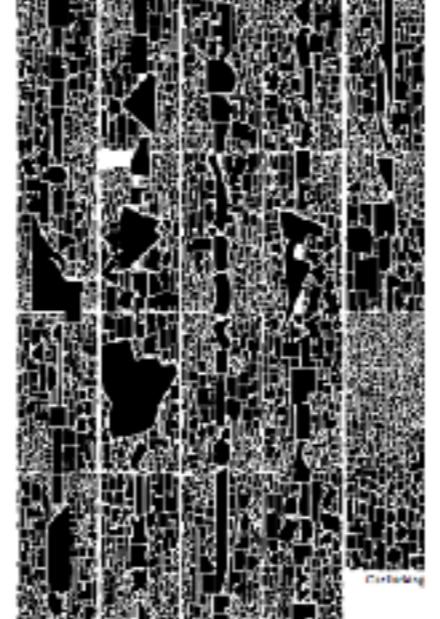
What the Street?  
<http://whatthestreet.moscow.com>

London



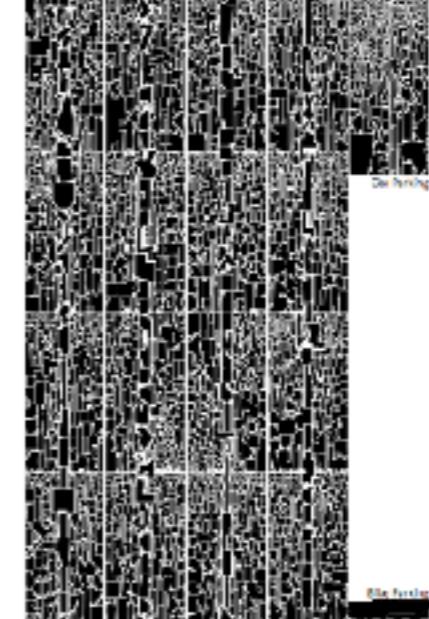
What the Street?  
<http://whatthestreet.london.com>

Chicago



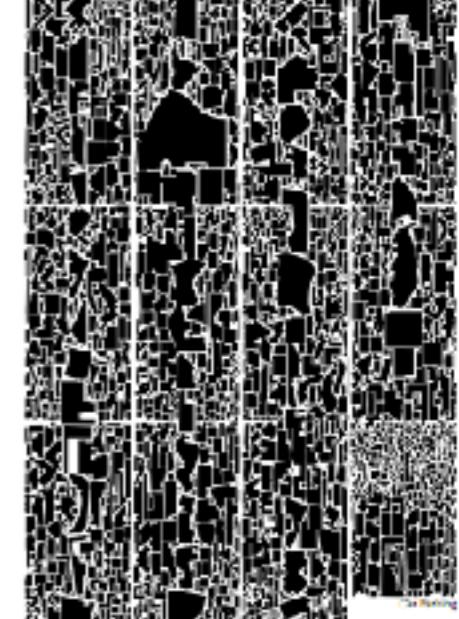
What the Street?  
<http://whatthestreet.chicago.com>

Berlin



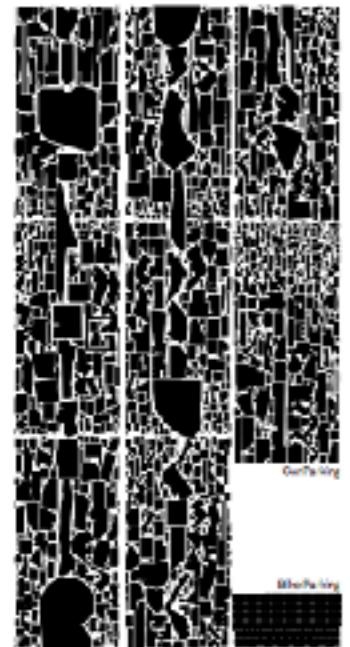
What the Street?  
<http://whatthestreet.berlin.com>

Los Angeles



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

New York



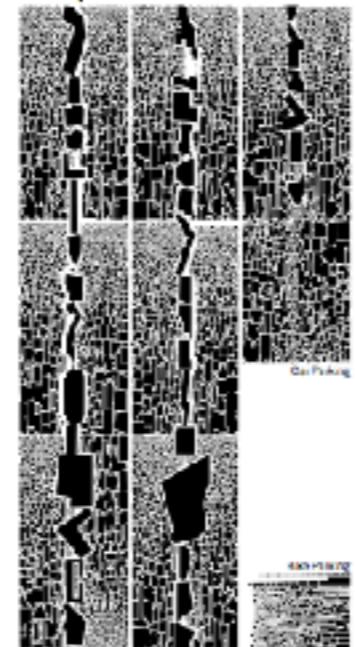
What the Street?  
<http://whatthestreet.ny.com>

Helsinki



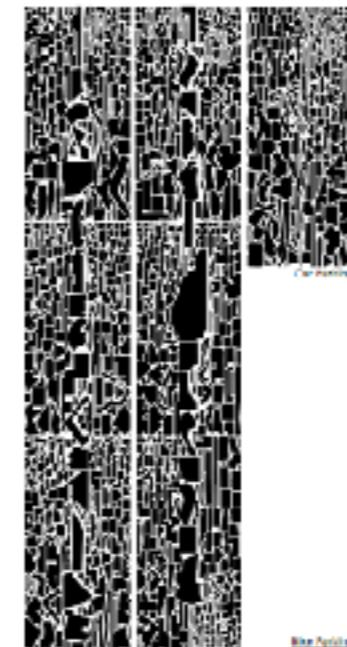
What the Street?  
<http://whatthestreet.helsinki.com>

Tokyo



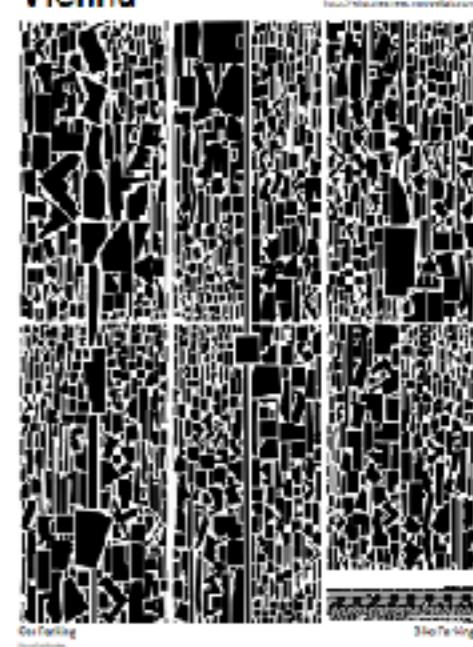
What the Street?  
<http://whatthestreet.tokyo.com>

Rome



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

Vienna



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

Use graph algorithms to roll up  
ALL streets, bike lanes, and rails

<https://github.com/gboeing/osmnx>

Home Search Streets

No Parking Selected



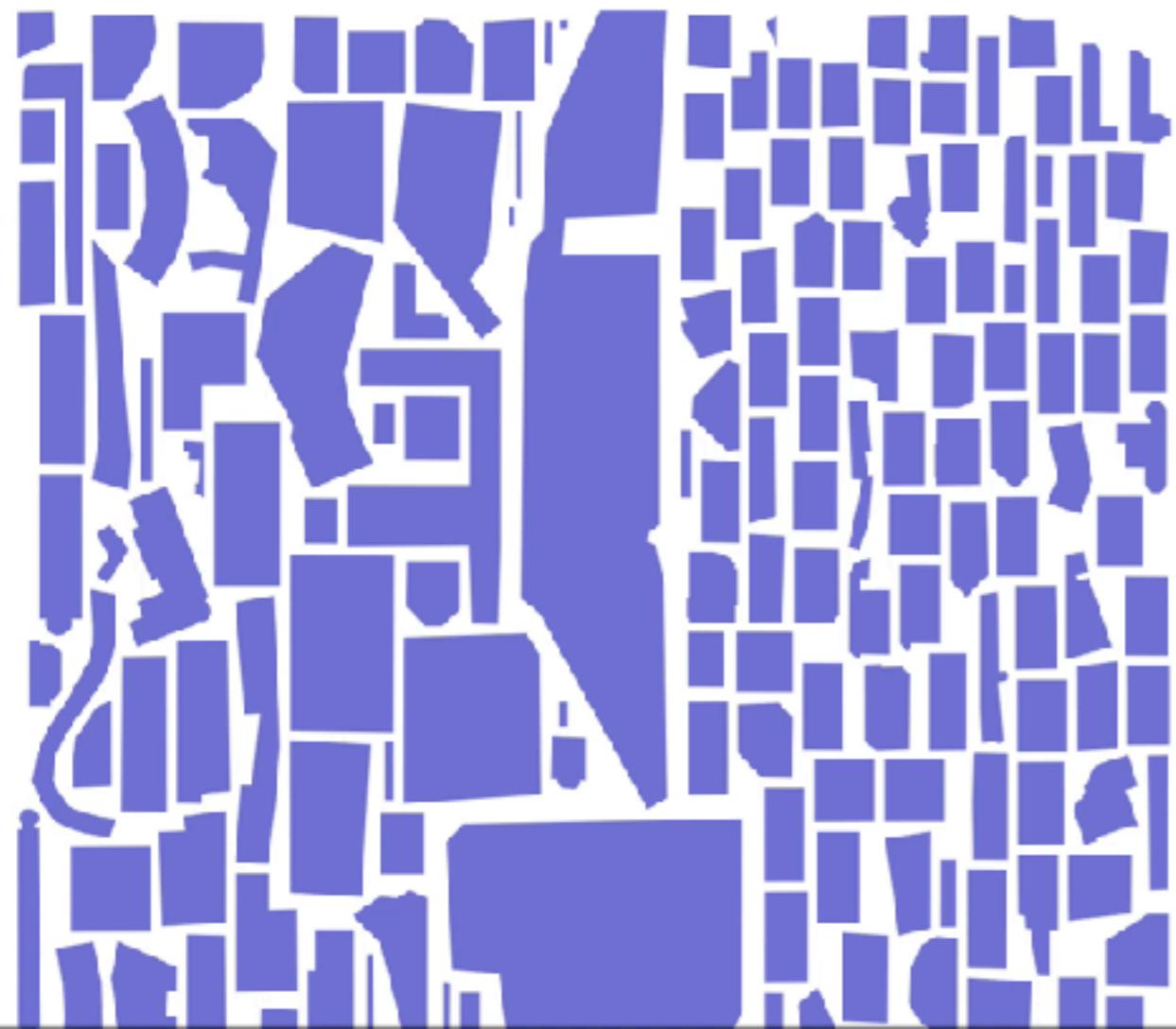
0 m<sup>2</sup>

0.0 m<sup>2</sup>

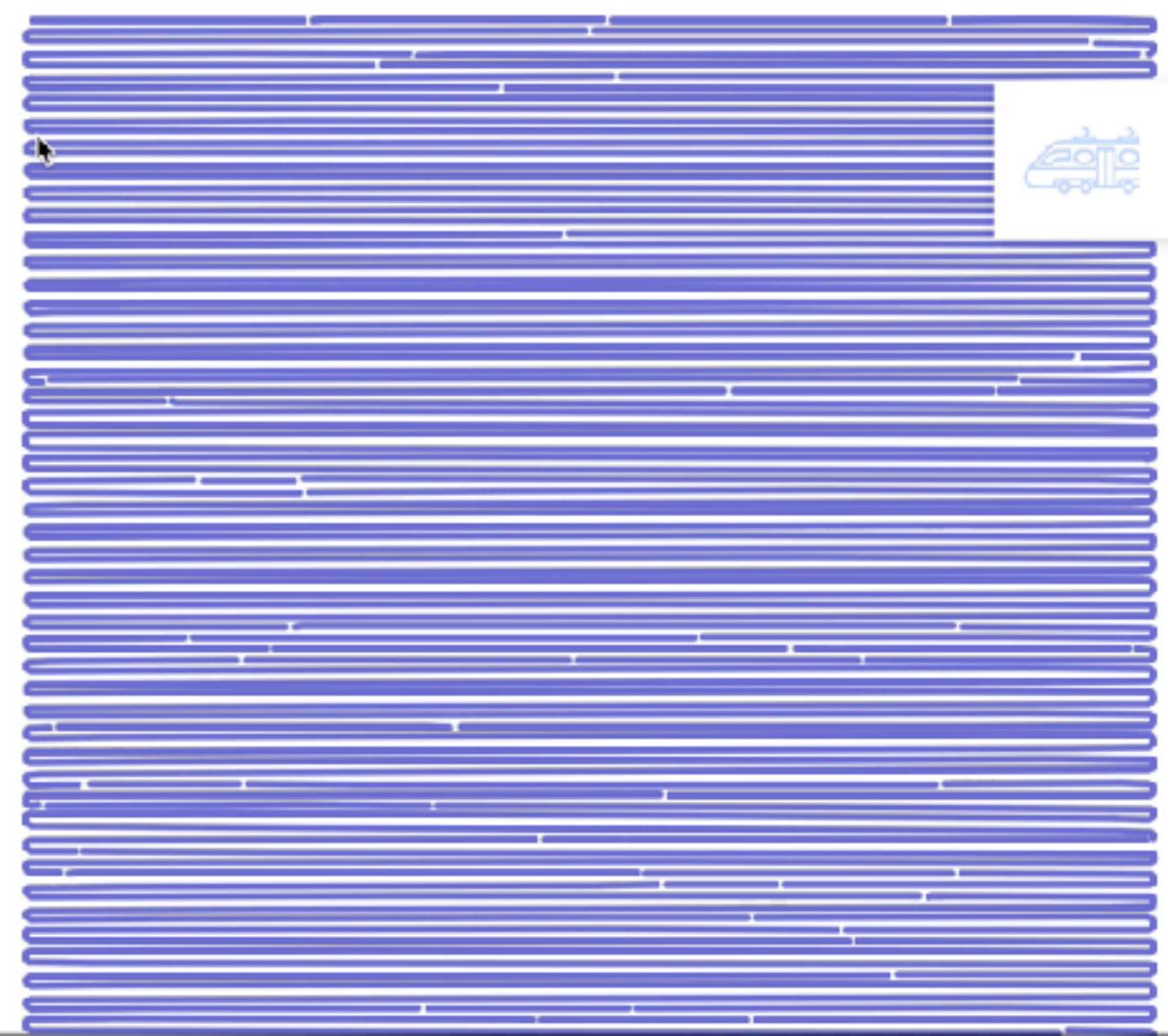


No Lane Selected

Car Parking

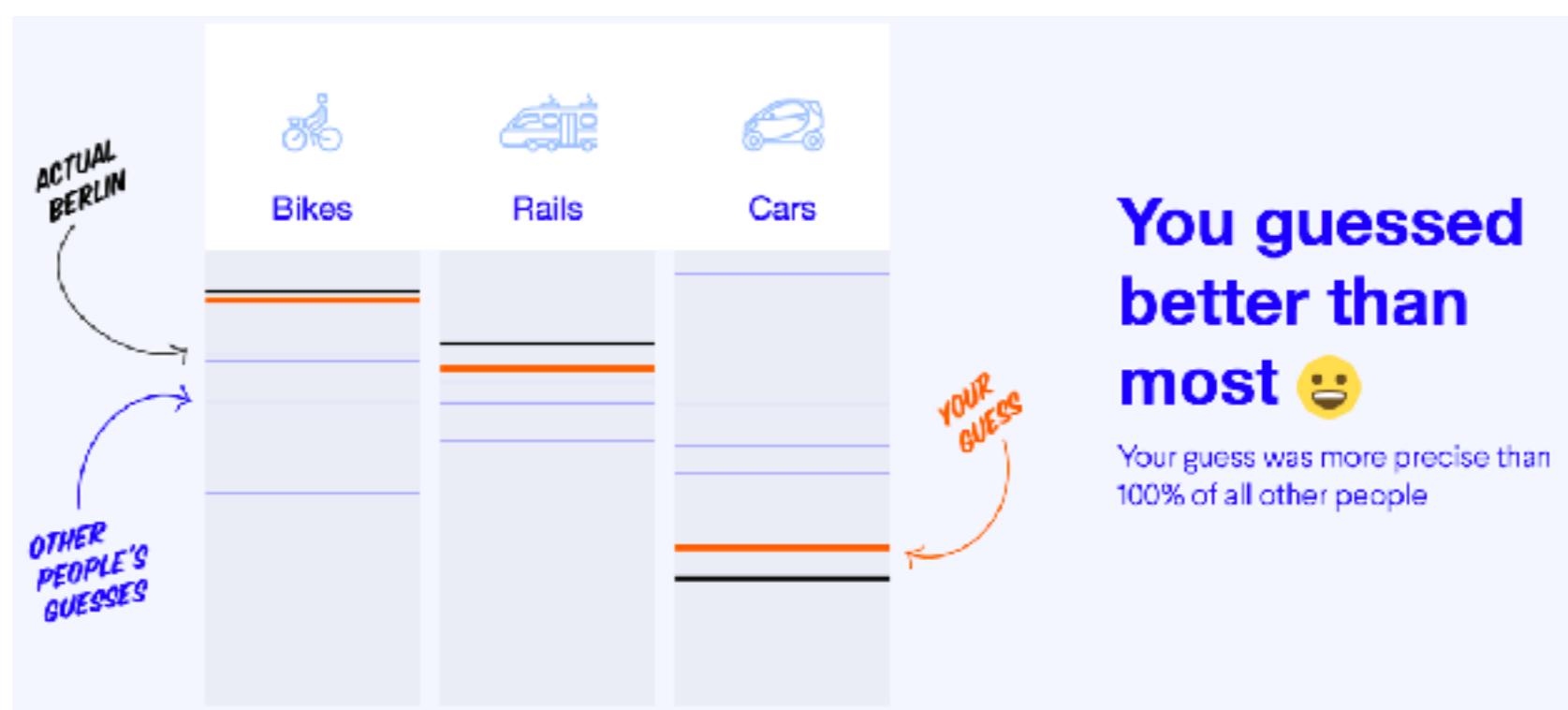
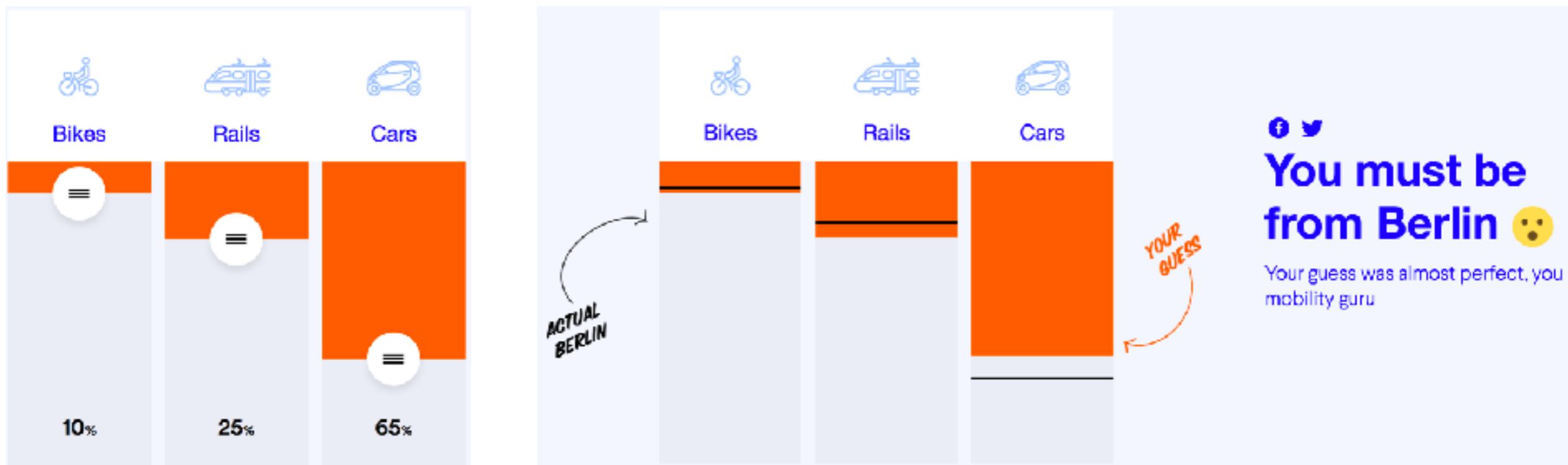


Car Lanes

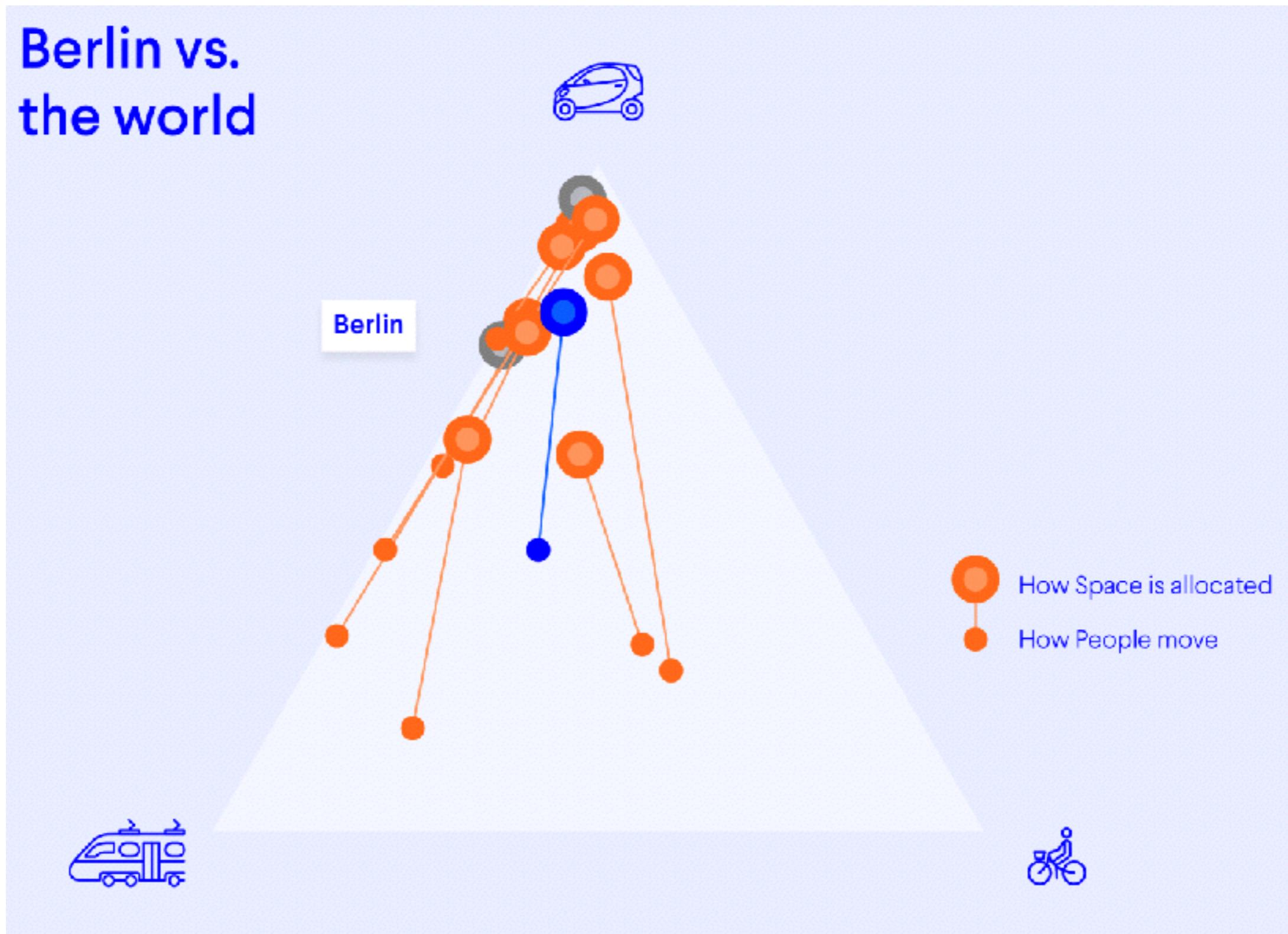


↑ Scroll to next →

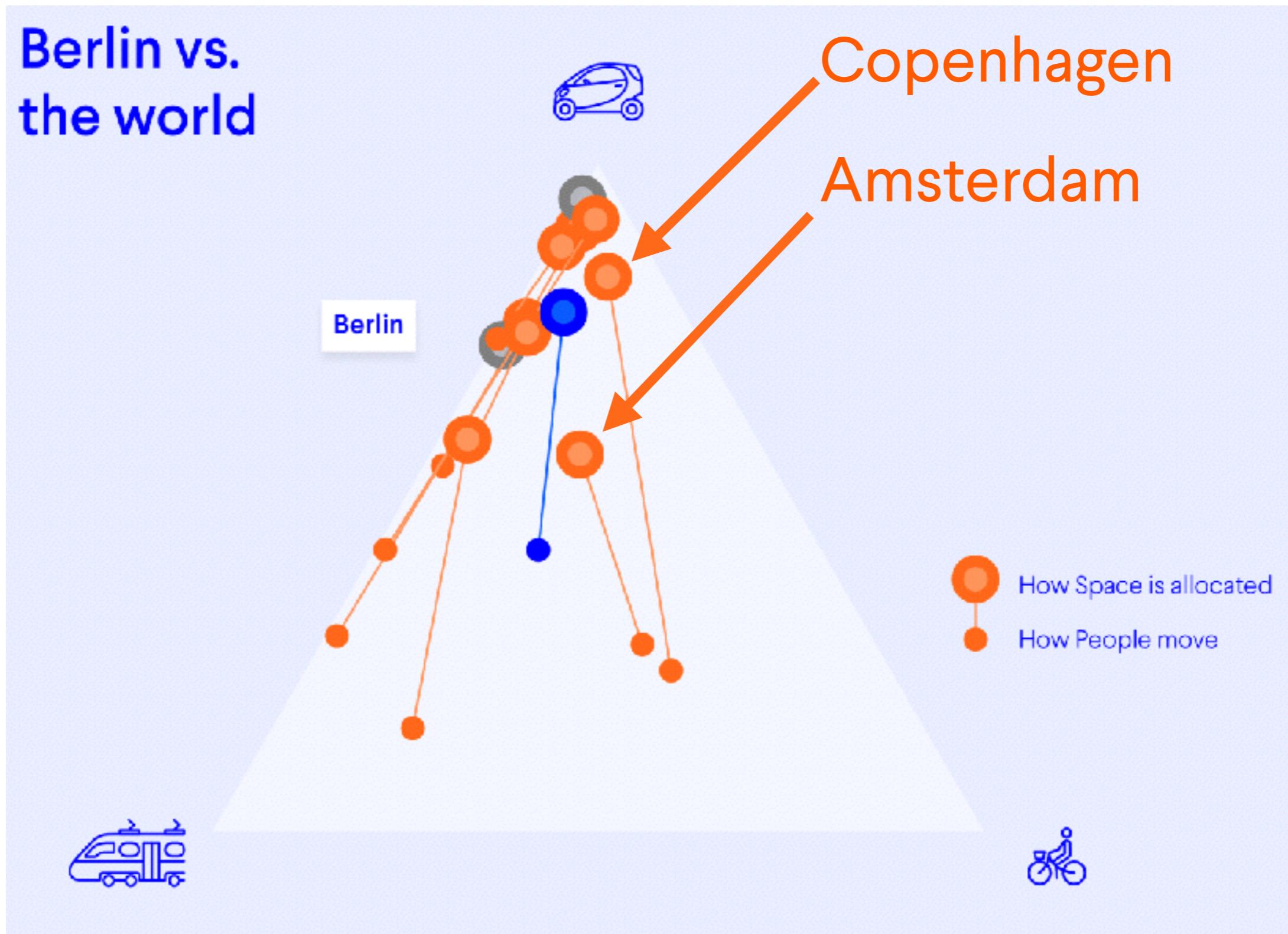
# Exploring "The arrogance of space" interactively



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



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

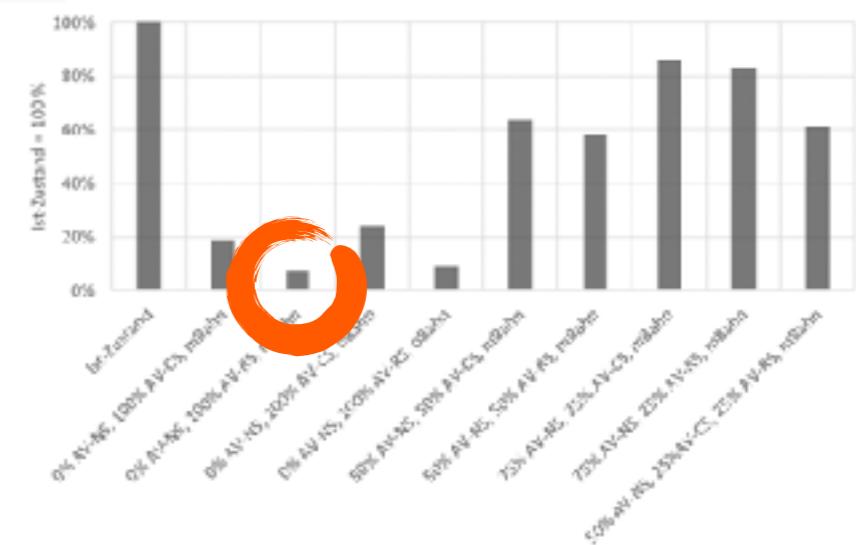
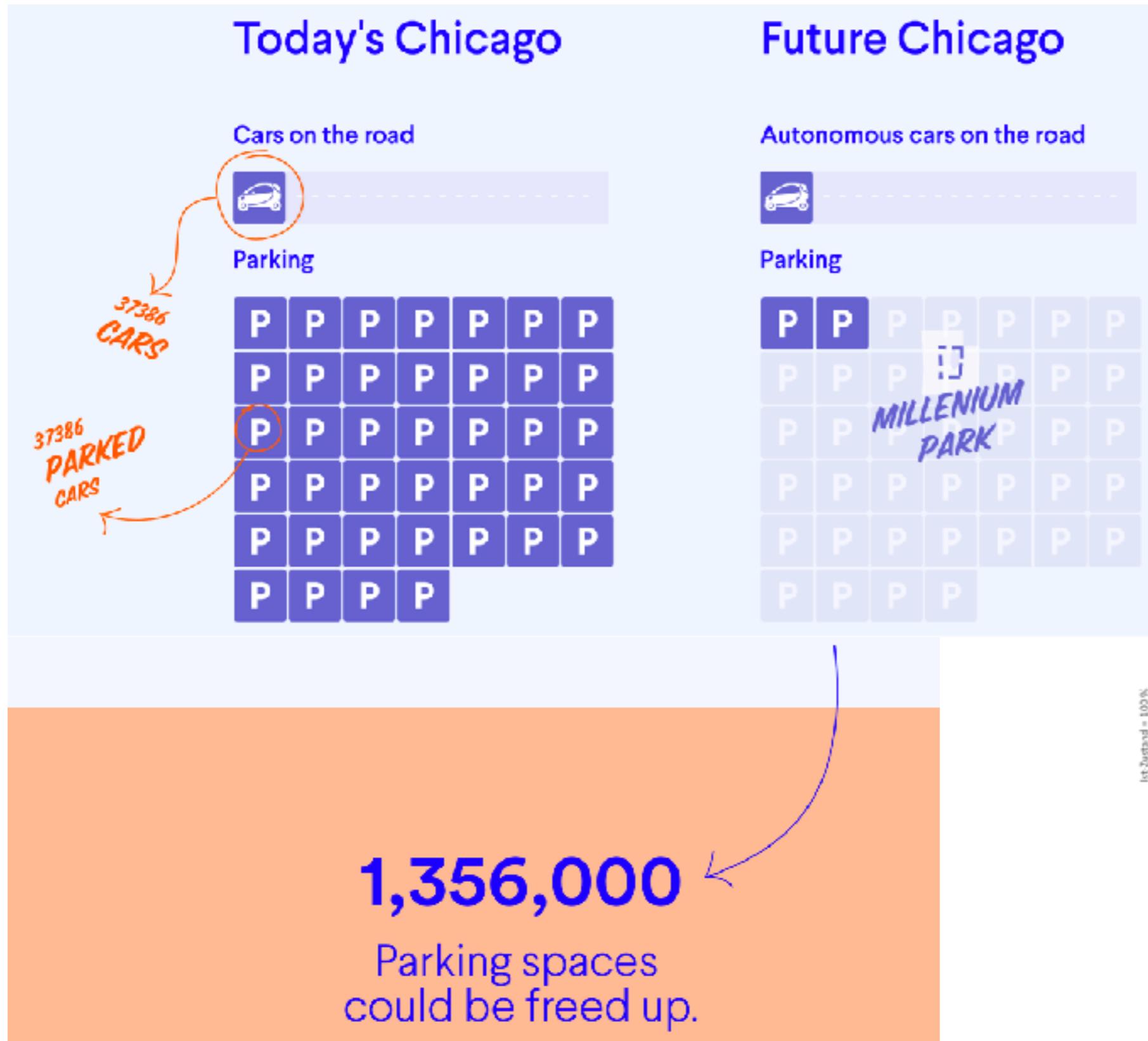


How can we get back the space?

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



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

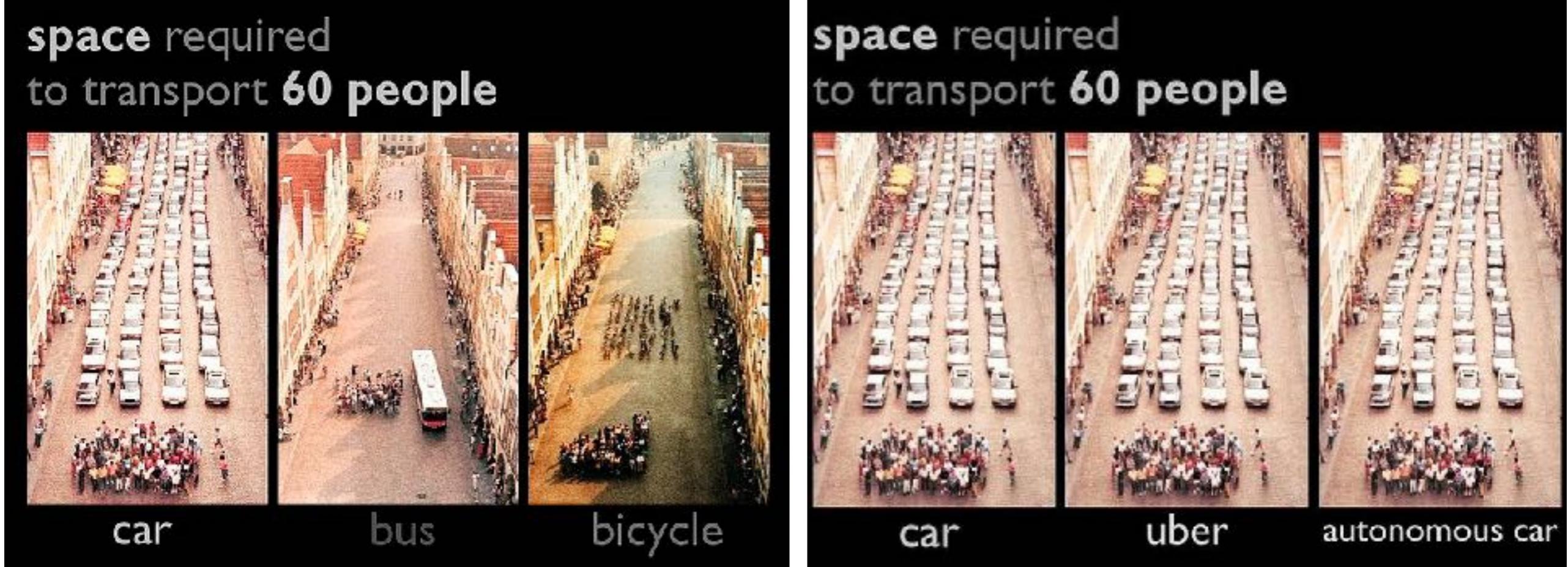


Friedrich & Hartl, Univ. Stuttgart (2016)

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



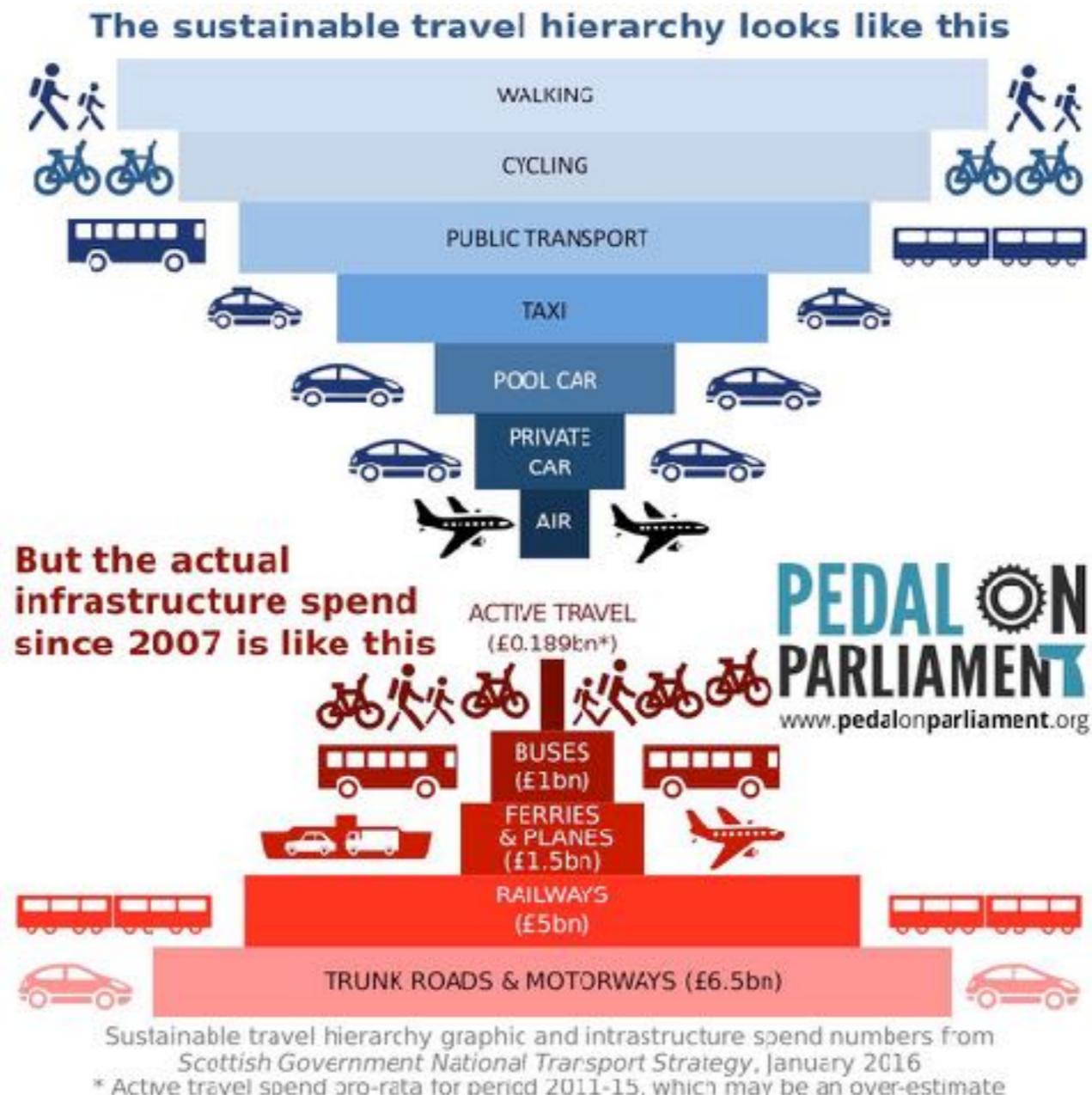
# Autonomous, shared cars are nice, but NOT the ultimate solution



Technical solutions alone are not feasible.

We need non-technical solutions:  
Major policy changes

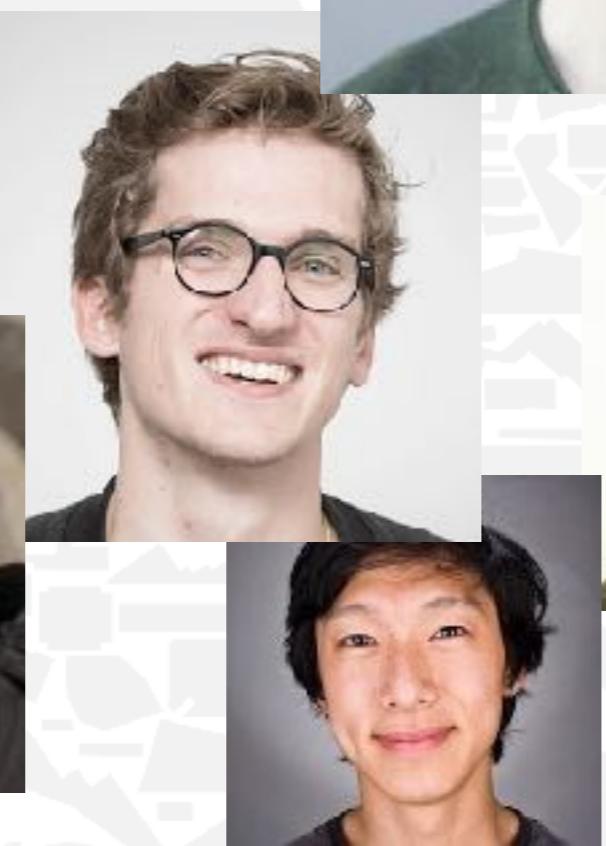
# Let us prioritize + incentivize what works best for society



Good scaling arguments why car-centric cities are not sustainable

Gossling and Choi, Ecol Econ 113 (2015)  
Louf and Barthelemy, PRL 111.19 (2013)

# [whatthestreet.moovellab.com](http://whatthestreet.moovellab.com)



Thx to OpenStreetMap for all the data!

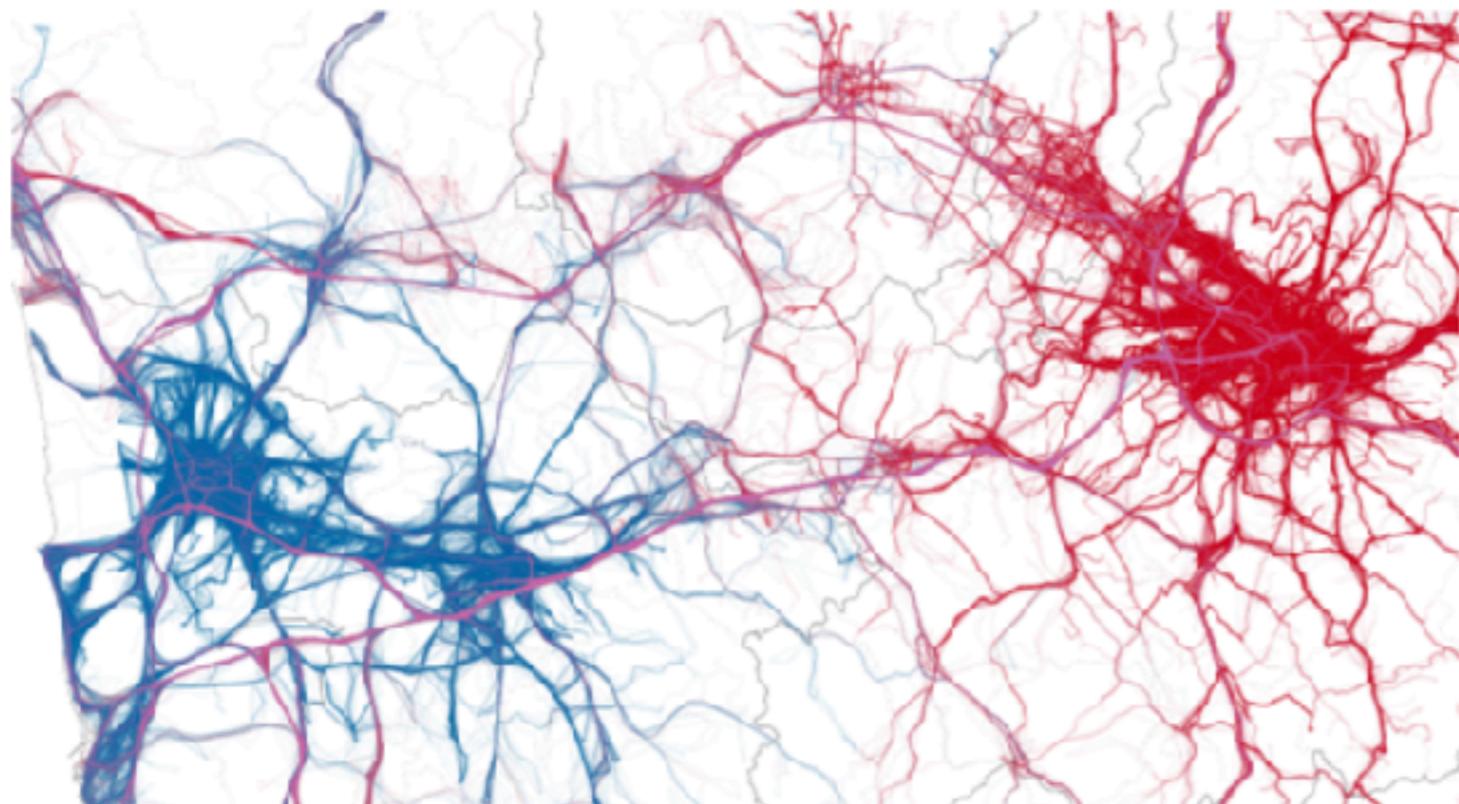
# New EPJ Data Science thematic series on human mobility

Michael Szell  
[@mszell](https://twitter.com/mszell)  
[michael.szell@gmail.com](mailto:michael.szell@gmail.com)  
<http://michael.szell.net>

*EPJ Data Science* welcomes submissions to a new thematic series on  
**Individual and Collective Human Mobility: Description, Modelling, Prediction.**

The team of guest editors behind the series talk about their vision and motivation to gather experts from different fields in the effort to better understand human behaviour. The deadline for submissions is 31 December 2017.

**Ana Valente** 8 Jun 2017



*Guest post by Filippo Simini, Philipp Hövel, Michael Szell, Luca Pappalardo, Gourab Ghoshal*