



# Charged Cities

## Access and Equity in the Age of Electric Micromobility

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 <https://platial.science>

    [platialanalysis](#)



# Place & Space





AIKATALO

FEDERAAL  
ANNOUITING





NINTH  
← 300 200 →



PARTS

DRURY  
DRURY  
DRURY  
DRURY

Client Parking

DRURY  
DRURY

NO PARKING  
THIS SIDE  
IN THIS  
BLOCK



# Digital exhaust

Where our physical world meets our digital lives





Figure: MIT Technology Review



# Outline: A tale in 3 parts



MobilityVitality



ConnectedCommunities



MicromobilityEquity



Mobility Vitality

# URBAN VITALITY



3<sup>e</sup> Avenue

pattes & griffes

Le Treille

Le Treille  
TAVERNE IRLANDAISE

PROMENADE  
WELLINGTON  
.COM

M  
MESSI  
GMAR  
5 - 1  
767.99

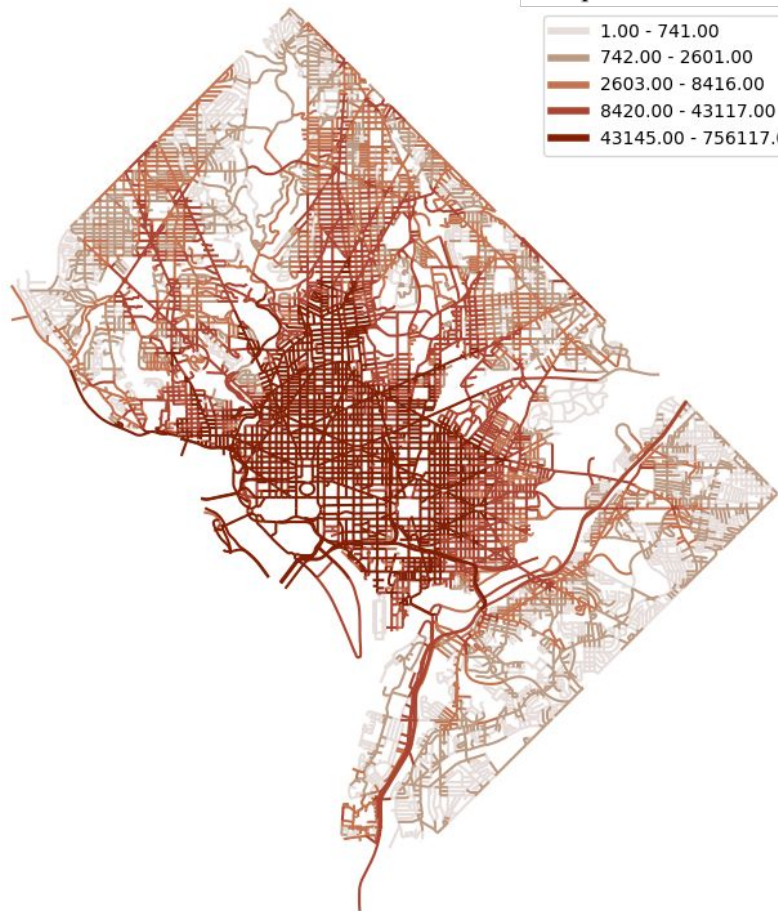


# Mobility Vitality

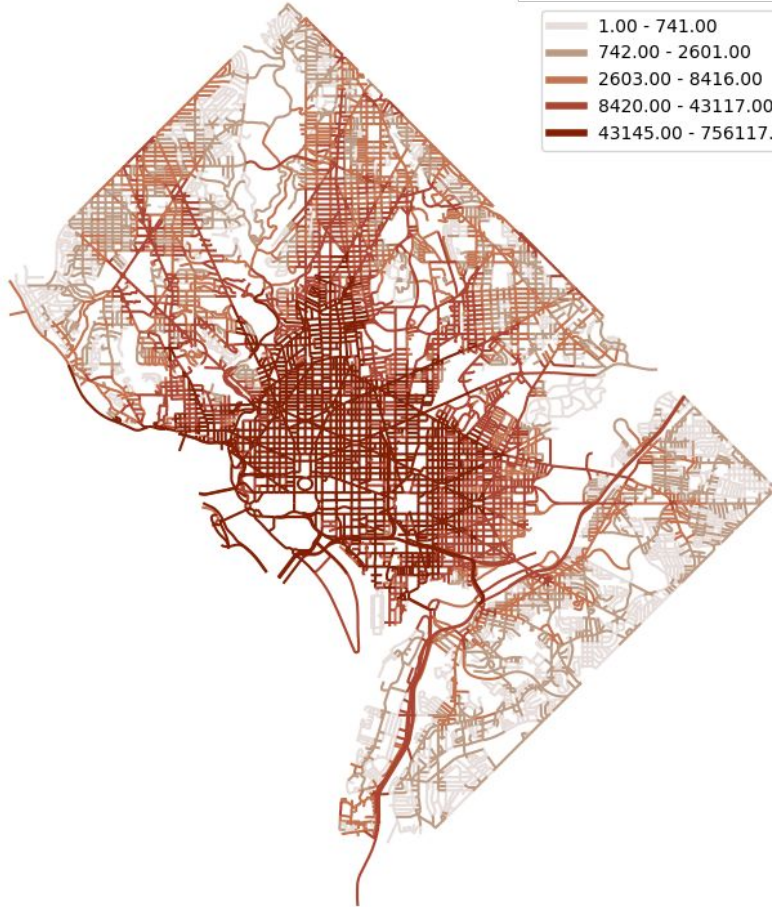
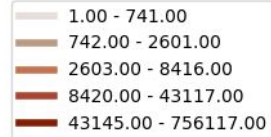




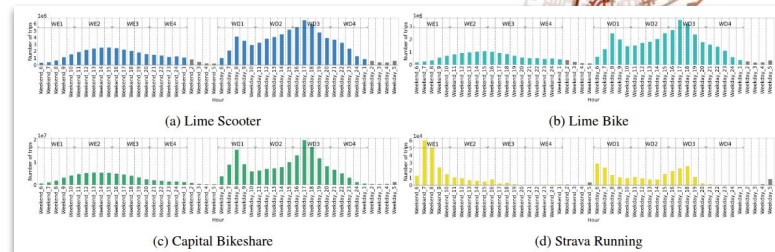
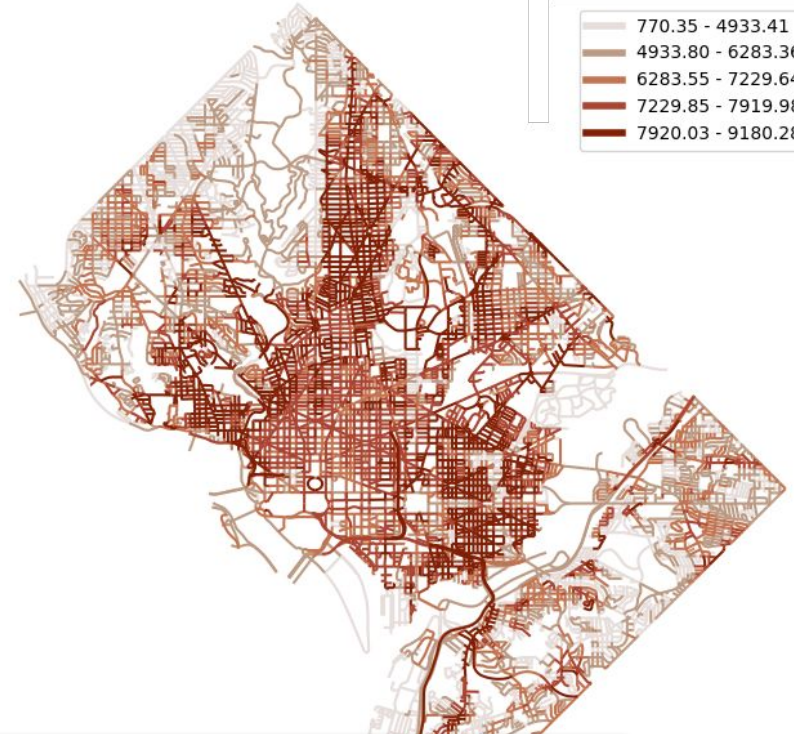
### Trip counts

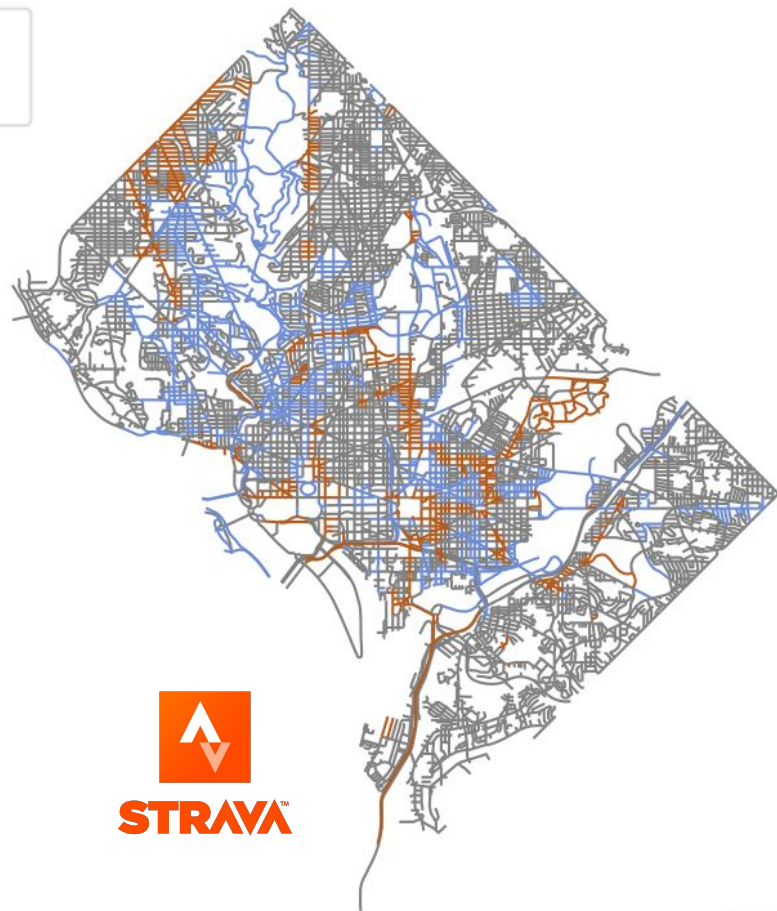
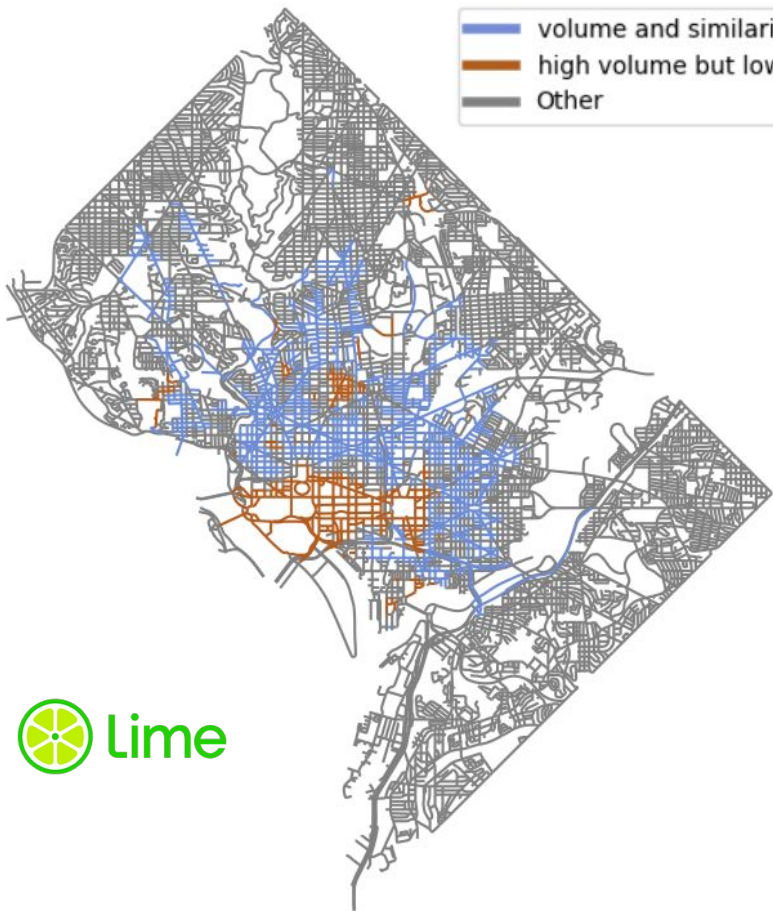
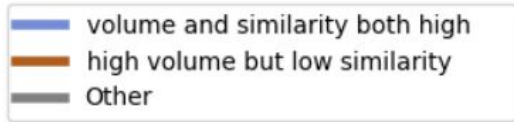


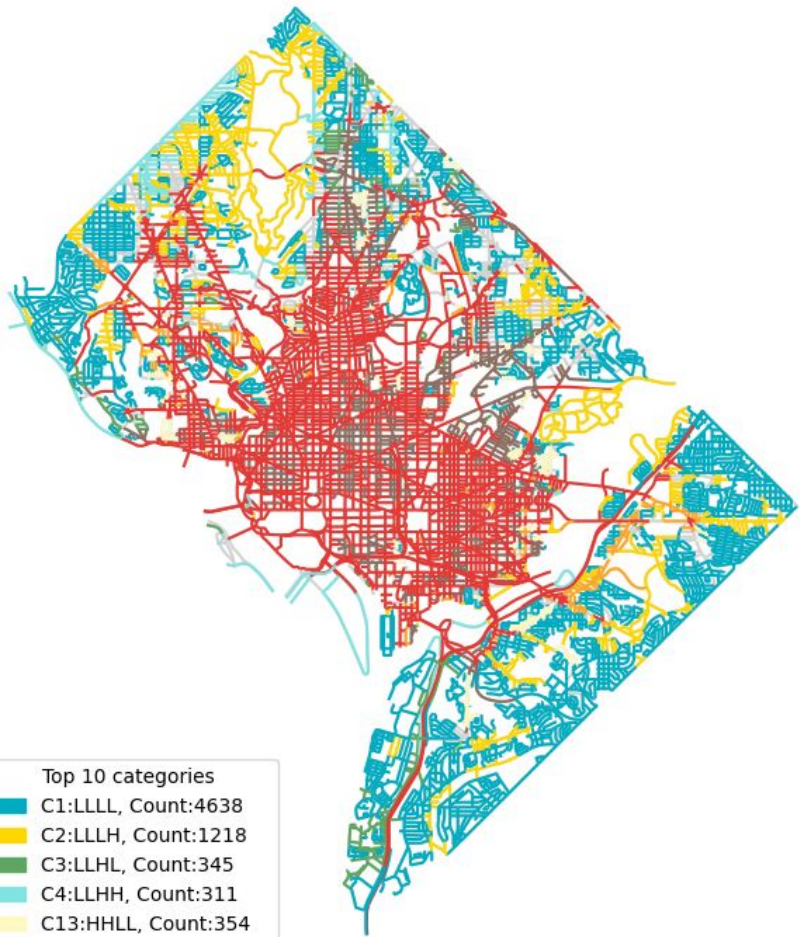
### Trip counts



### Sum of Cosine Similarity







Top 10 categories	
<span style="color: #00A0C0;">■</span>	C1:LLLL, Count:4638
<span style="color: #FFD700;">■</span>	C2:LLLH, Count:1218
<span style="color: #4CAF50;">■</span>	C3:LLHL, Count:345
<span style="color: #81D4FA;">■</span>	C4:LLHH, Count:311
<span style="color: #FFF9C4;">■</span>	C13:HLL, Count:354
<span style="color: #FF9800;">■</span>	C14:HHLH, Count:321
<span style="color: #795548;">■</span>	C15:HHHL, Count:1381
<span style="color: #D32F2F;">■</span>	C16:HHHH, Count:4452



Qiang, D., McKenzie, G. Mobility Vitality in Active and Micro-Mobility Modes: Measuring Urban Vitality Through Spatiotemporal Similarity, *AGILE Conference 2025*





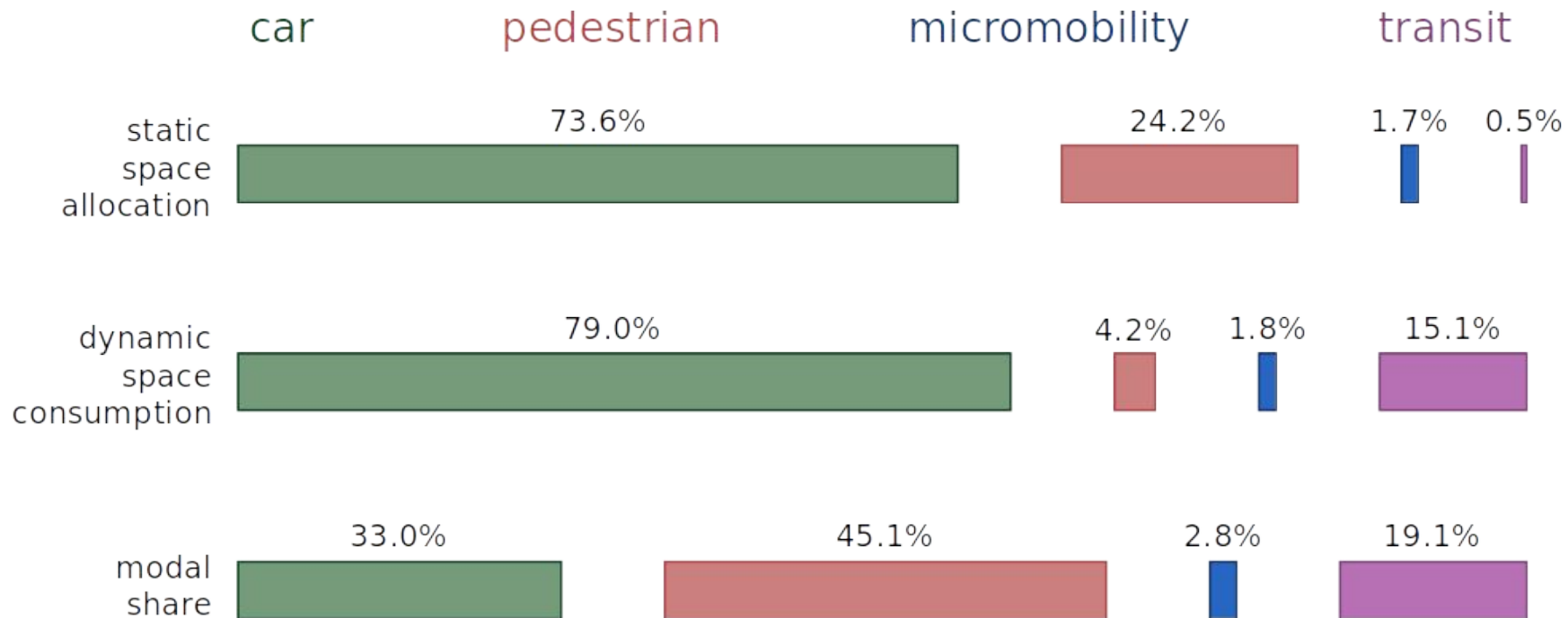
# **THE CARS ARE GOING TO BE ALRIGHT**

Examining micromobility infrastructure and space allocation in Montréal



# STREET SPACE ALLOCATION

## The street divided (New York City)



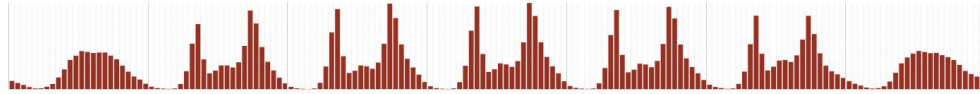
Connected Communities



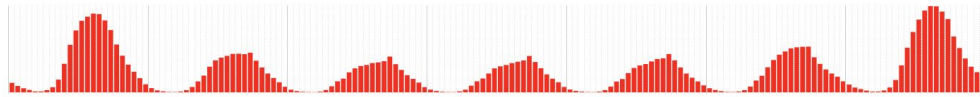


# DOCKED VS. DOCKLESS

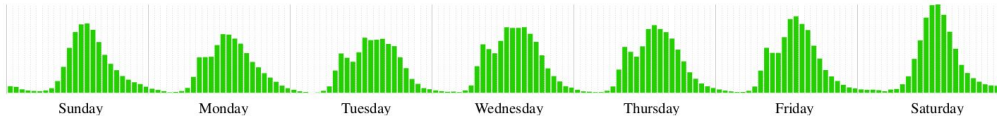
(Washington DC)



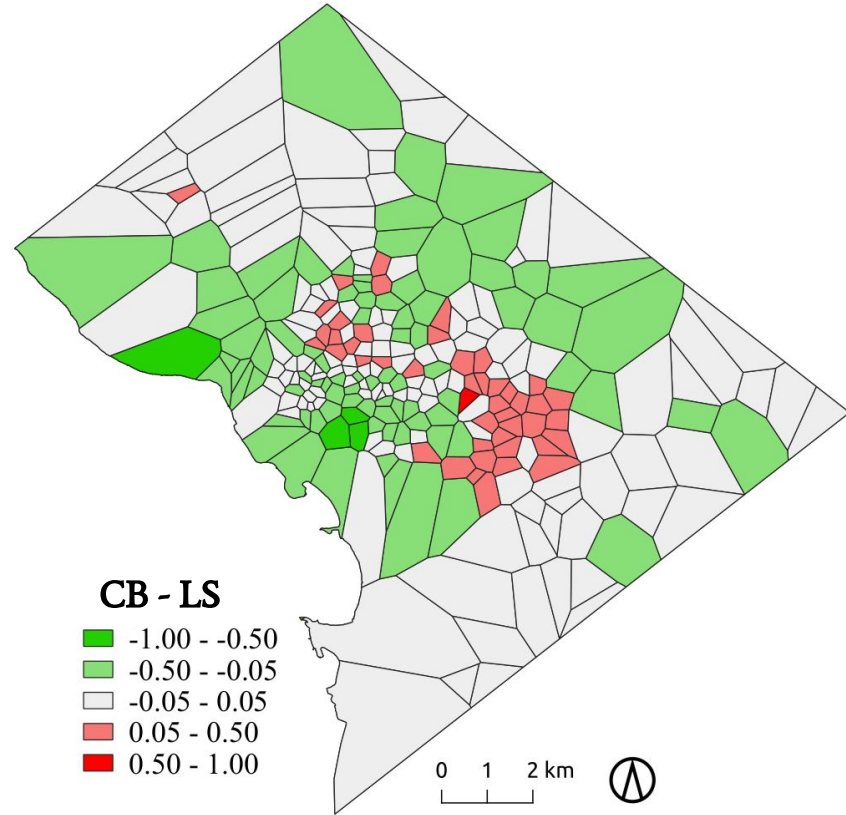
Capital Bikeshare (Member)



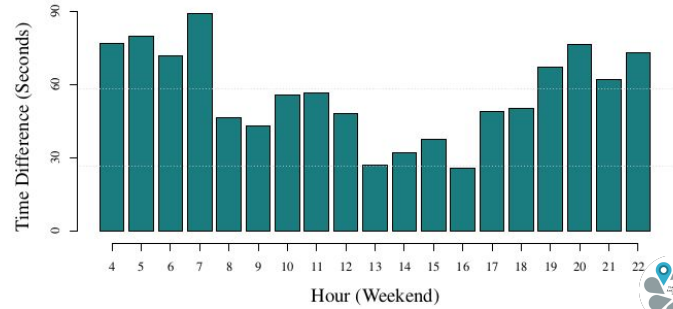
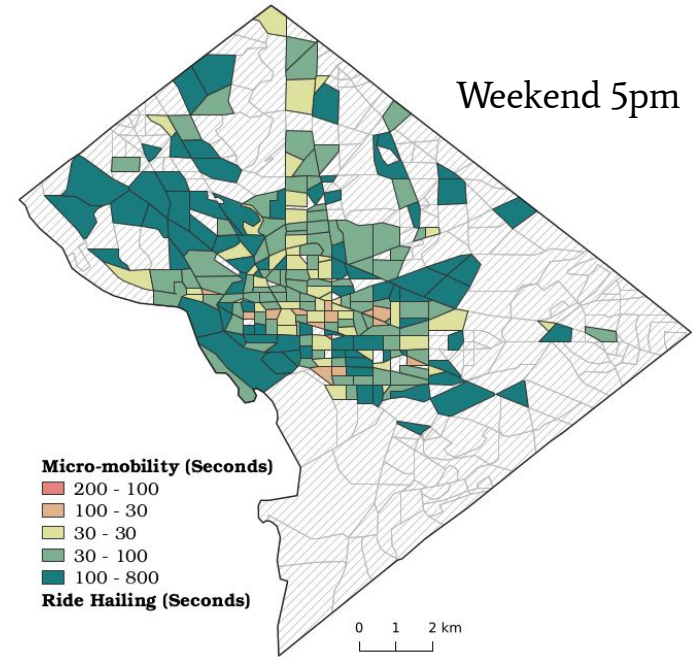
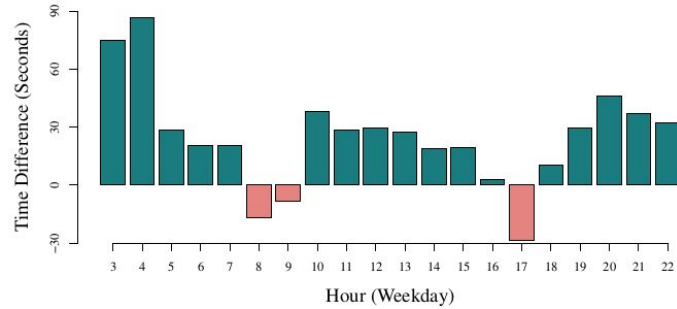
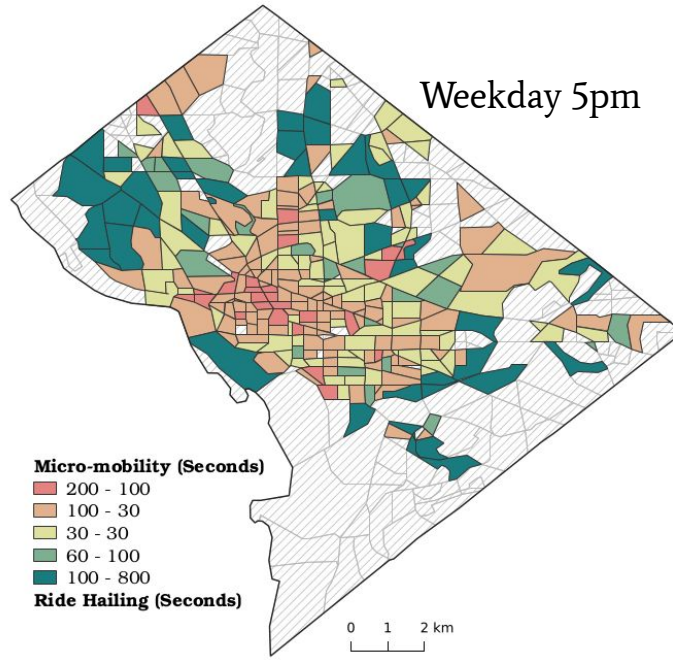
Capital Bikeshare (Casual)



Lime Scooter-share



# MICROMOBILITY VS. RIDE-HAILING



# THE 15-MINUTE-CITY







**Wellington**  
NZ



**London**  
UK



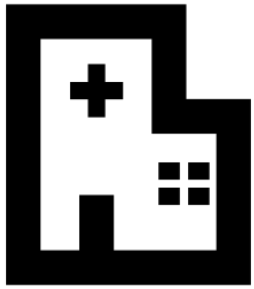
**Washington DC**  
US



**Berlin**  
DE

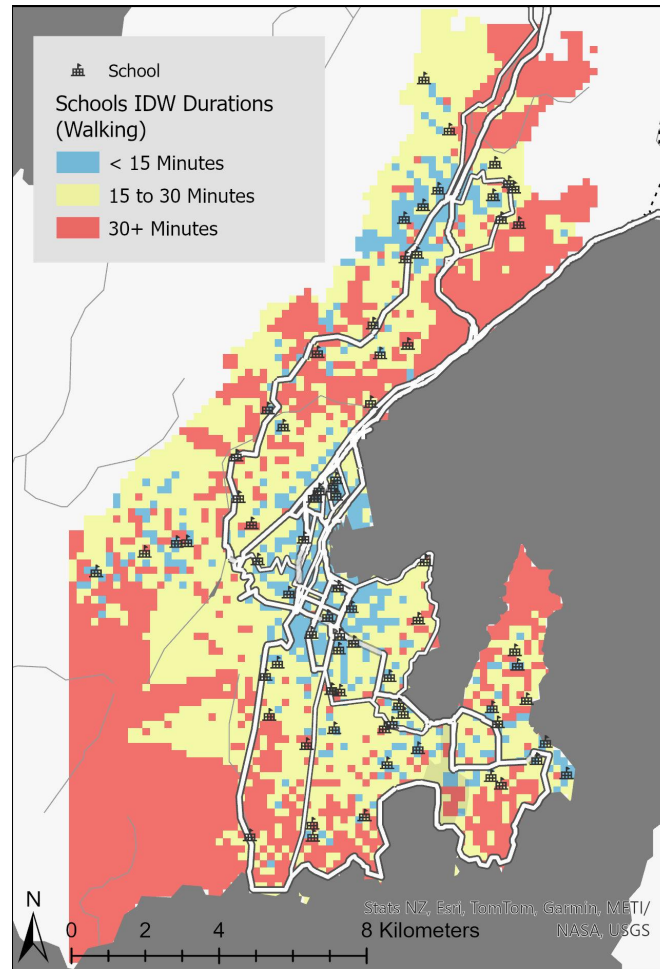


**Paris**  
FR

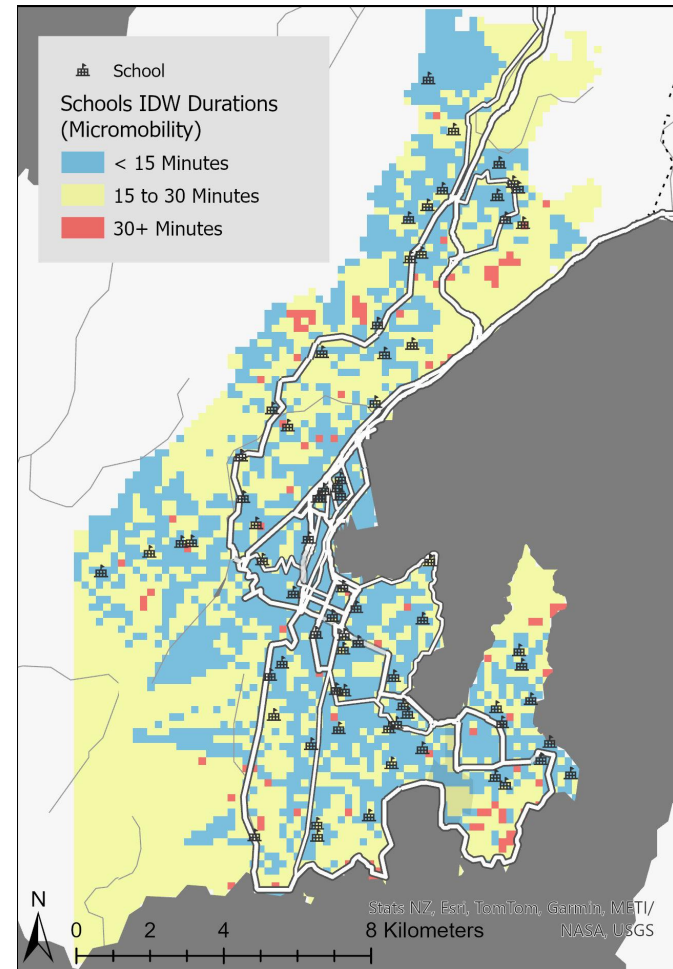


# WELLINGTON

## Access to Schools



Walking

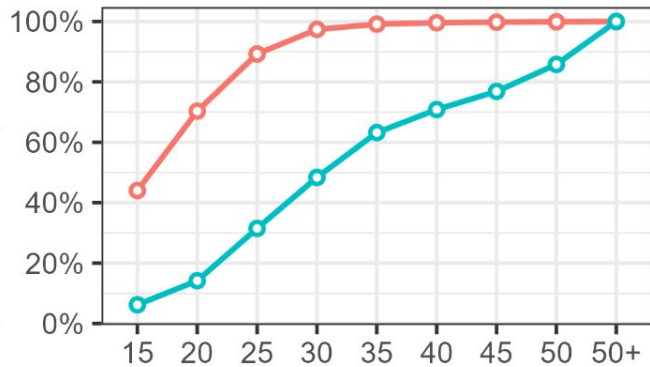


E-micromobility

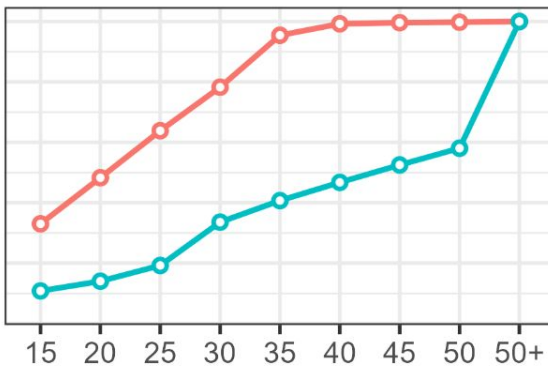


# WELLINGTON

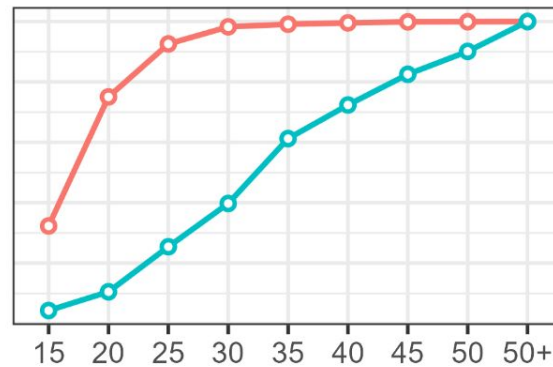
### Entertainment



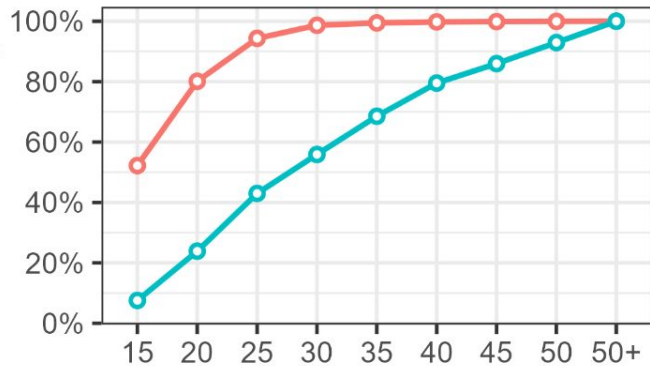
### Hospital



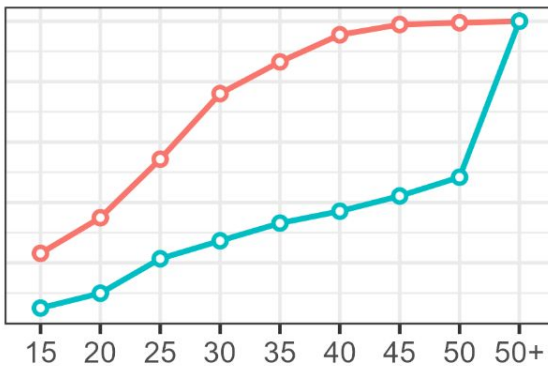
### Park



### School



### Supermarket



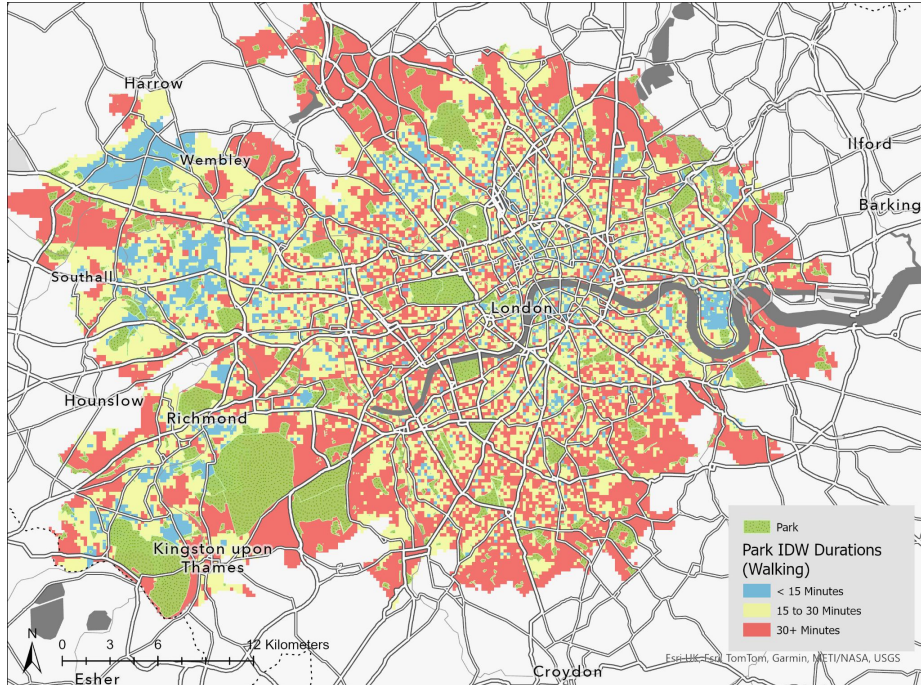
○ Micromobility    ○ Walking

Minutes

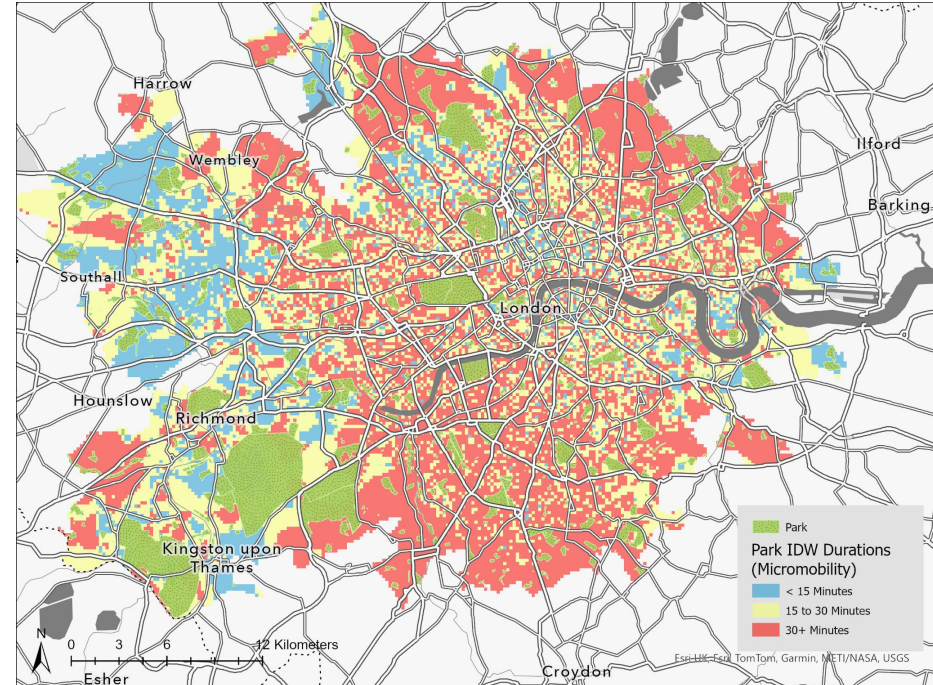


# LONDON

## Access to Parks



Walking

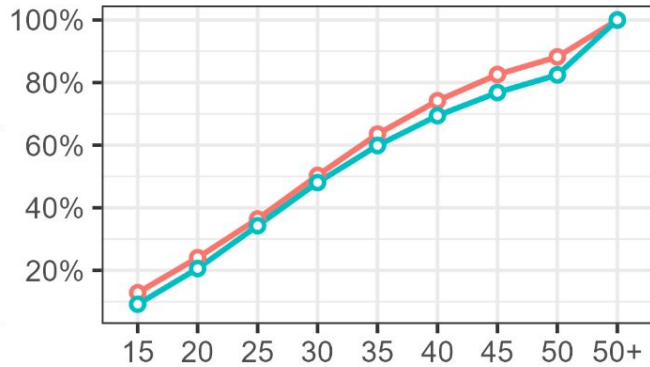


E-micromobility

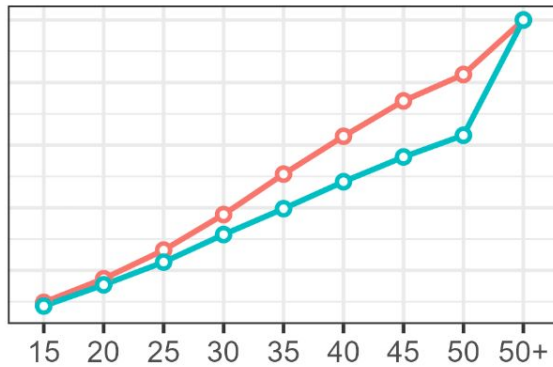


# LONDON

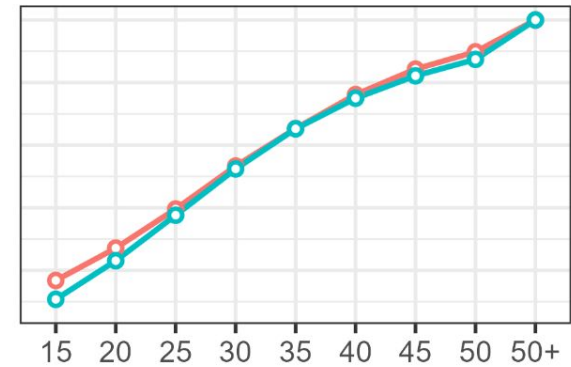
### Entertainment



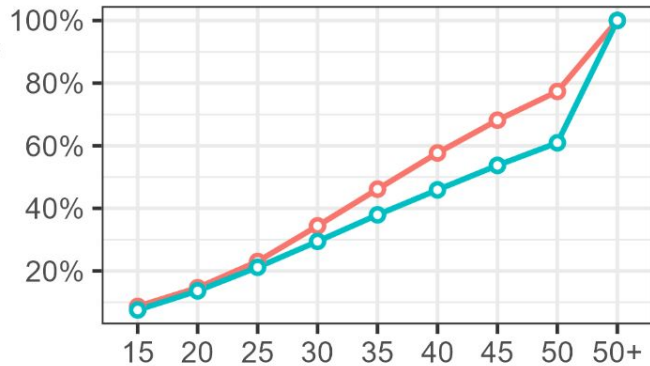
### Hospital



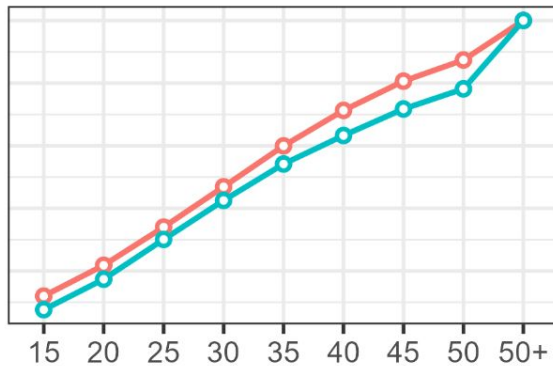
### Park



### School



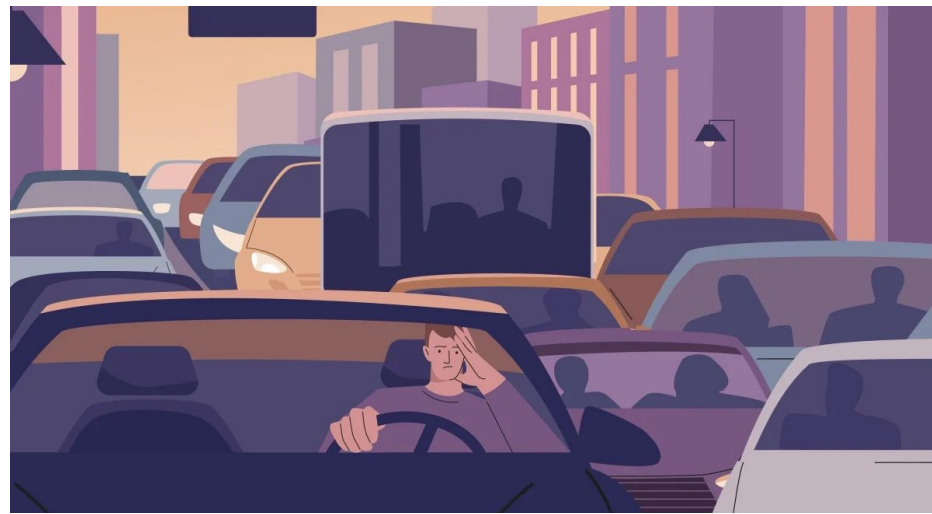
### Supermarket



○ Micromobility    ○ Walking

Minutes



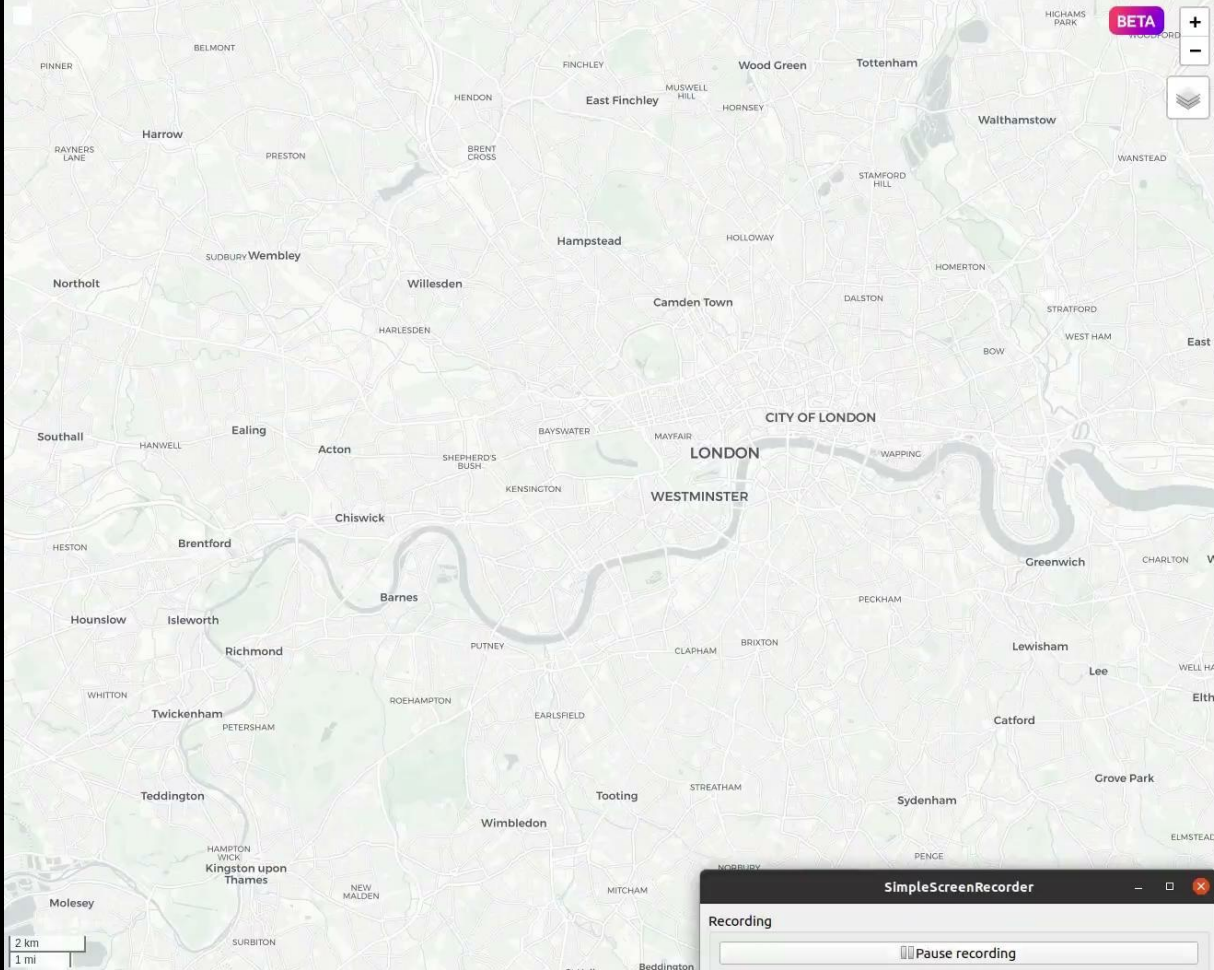


WE ARE A COLLABORATIVE PARTNERSHIP FOCUSING  
ON

SHARED ELECTRIC MICROMOBILITY  
AS A TRANSPORTATION SOLUTION IN  
CANADIAN SUBURBAN COMMUNITIES



**OPEN DATA + TOOLS**



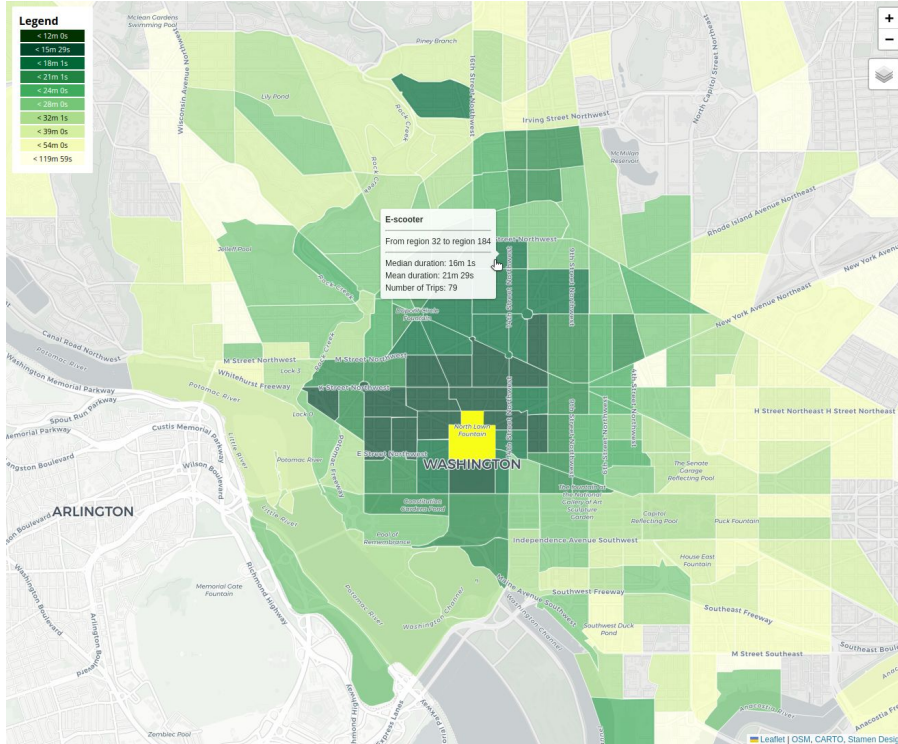
Select a city

[More information on the platform available here.](#)

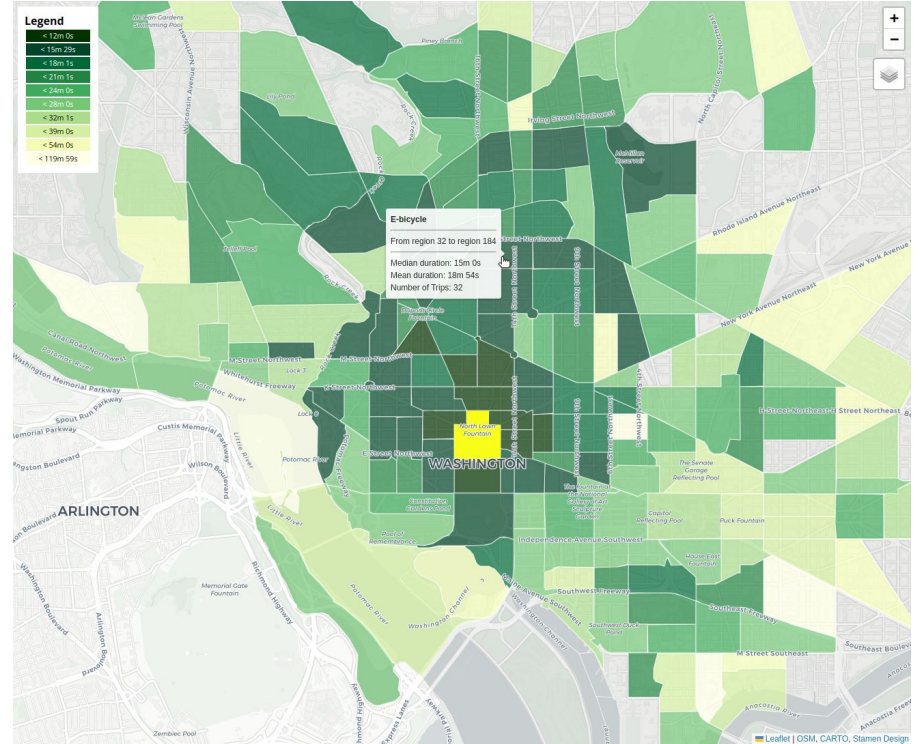
©2025 Platial Analysis Lab.



# Platform-based Exploratory Analysis: E-scooter vs. e-bicycle trip range

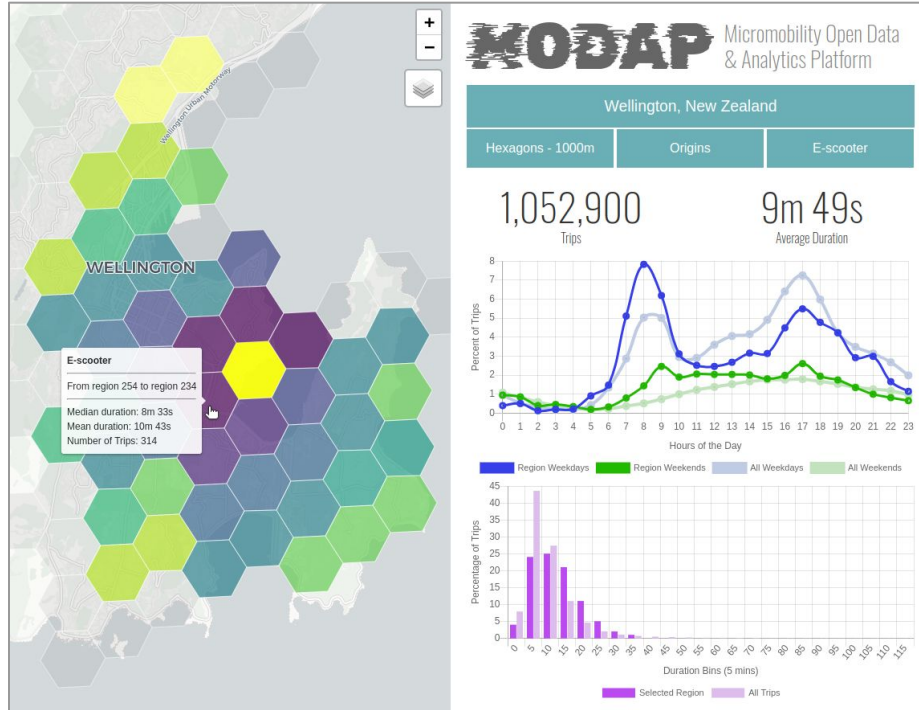


E-scooter

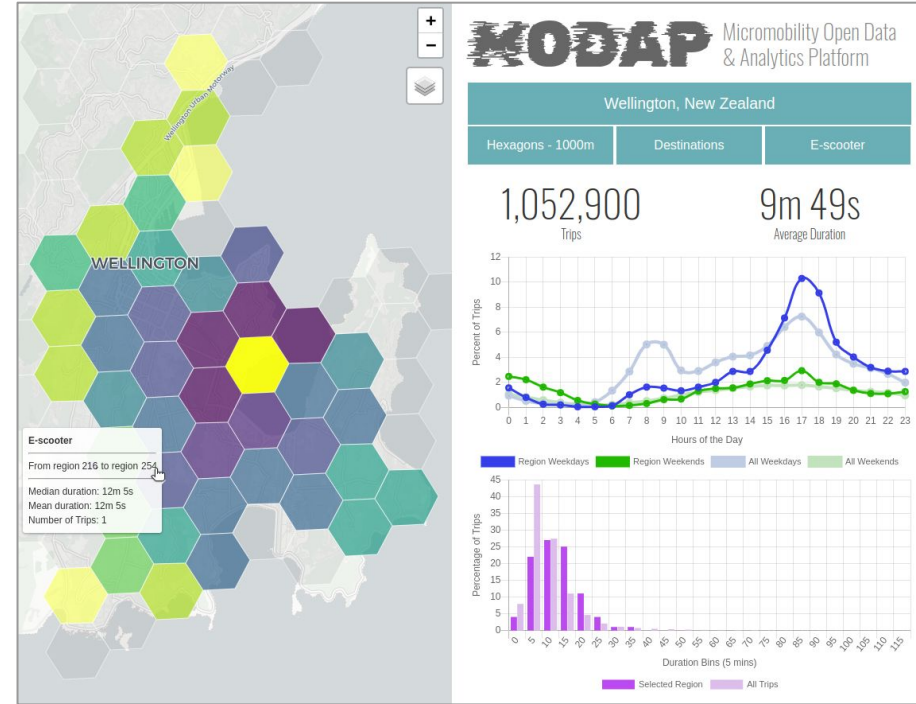


E-bicycle

# Platform-based Exploratory Analysis: Commuting Behaviour



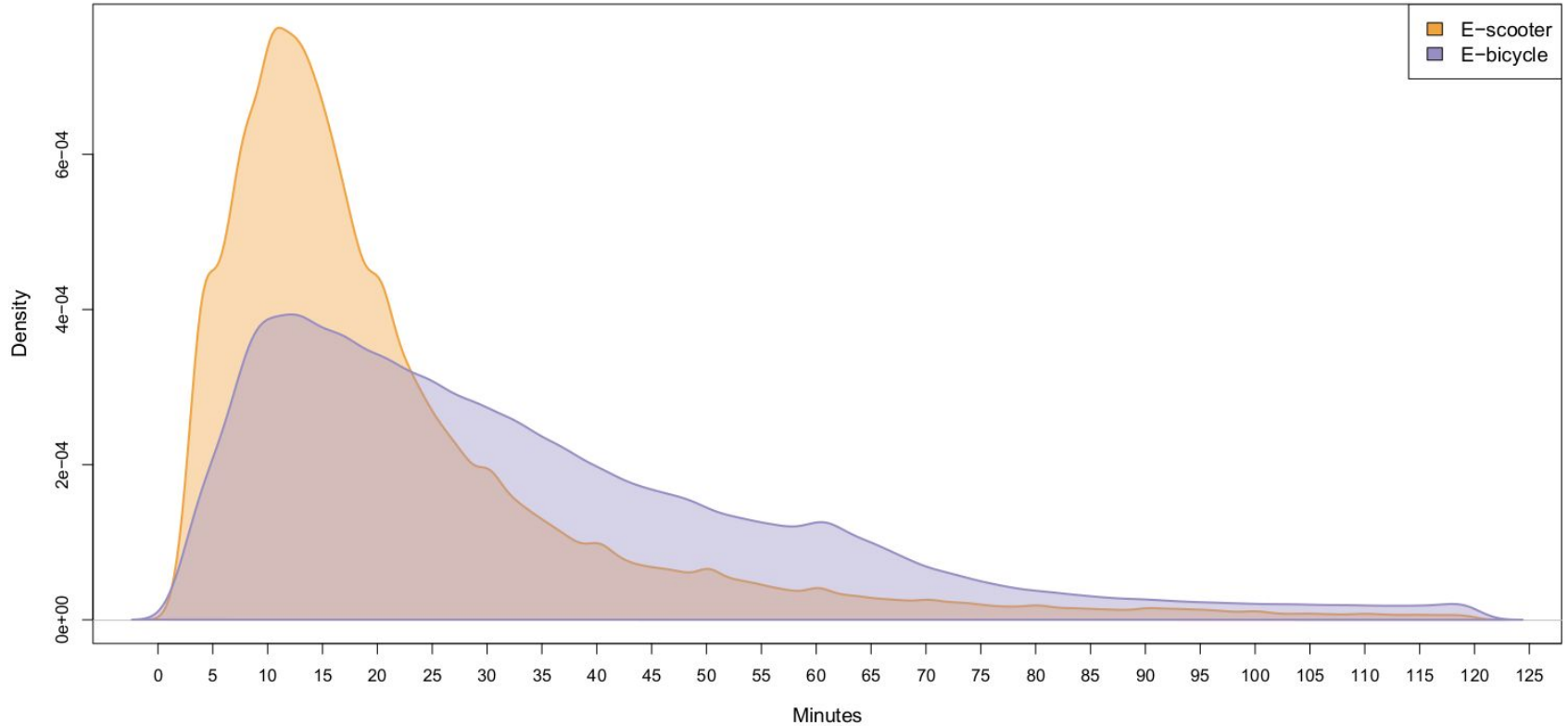
High morning commute as **Origin**



High morning commute as **Destination**



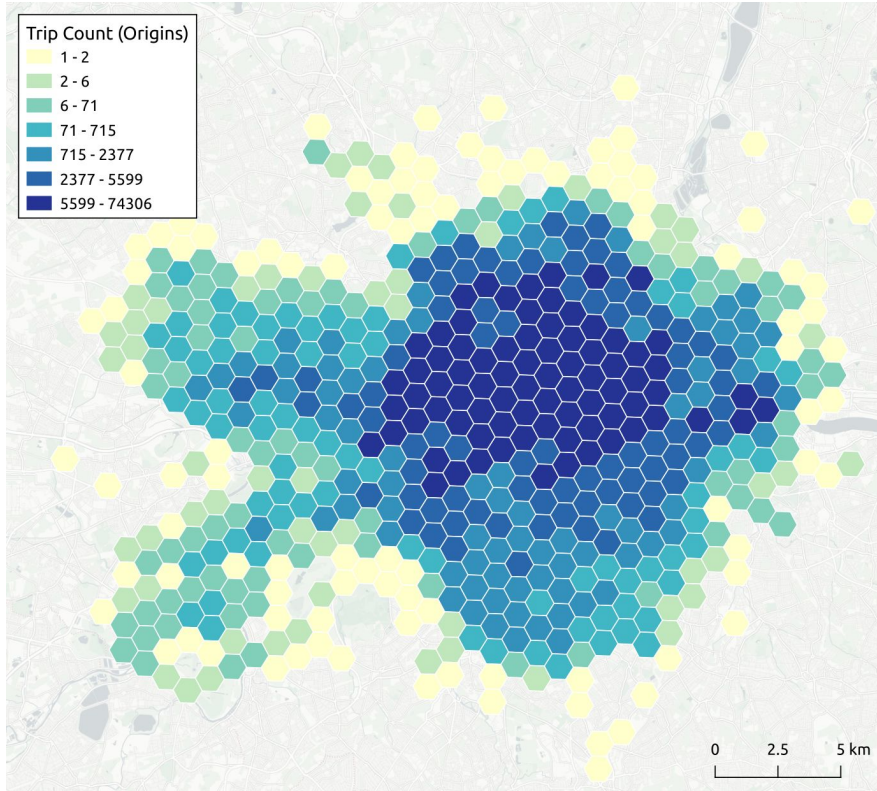
# Analysis with downloaded open data: E-scooter vs. E-bicycle



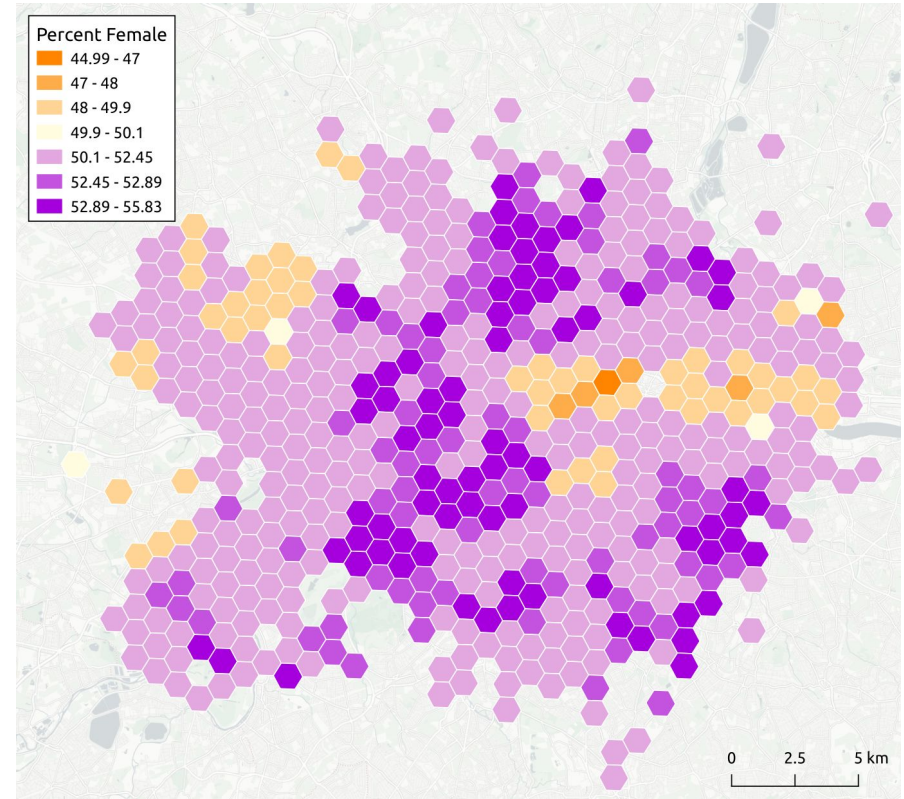
Density plots comparing **e-scooter** and **e-bicycle** trip duration in London, UK



# Analysis with downloaded open data: Trip & Gender correlations



Trip Count (trip originating)



Percent female population

Shared micromobility services are **not** equitable



Washington, DC

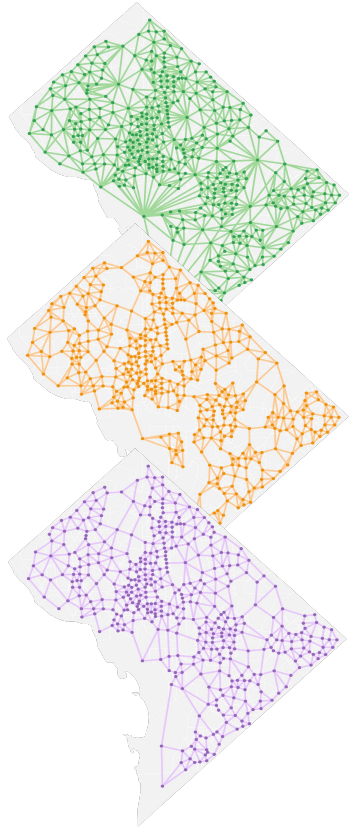


Atlanta, GA



Portland, OR

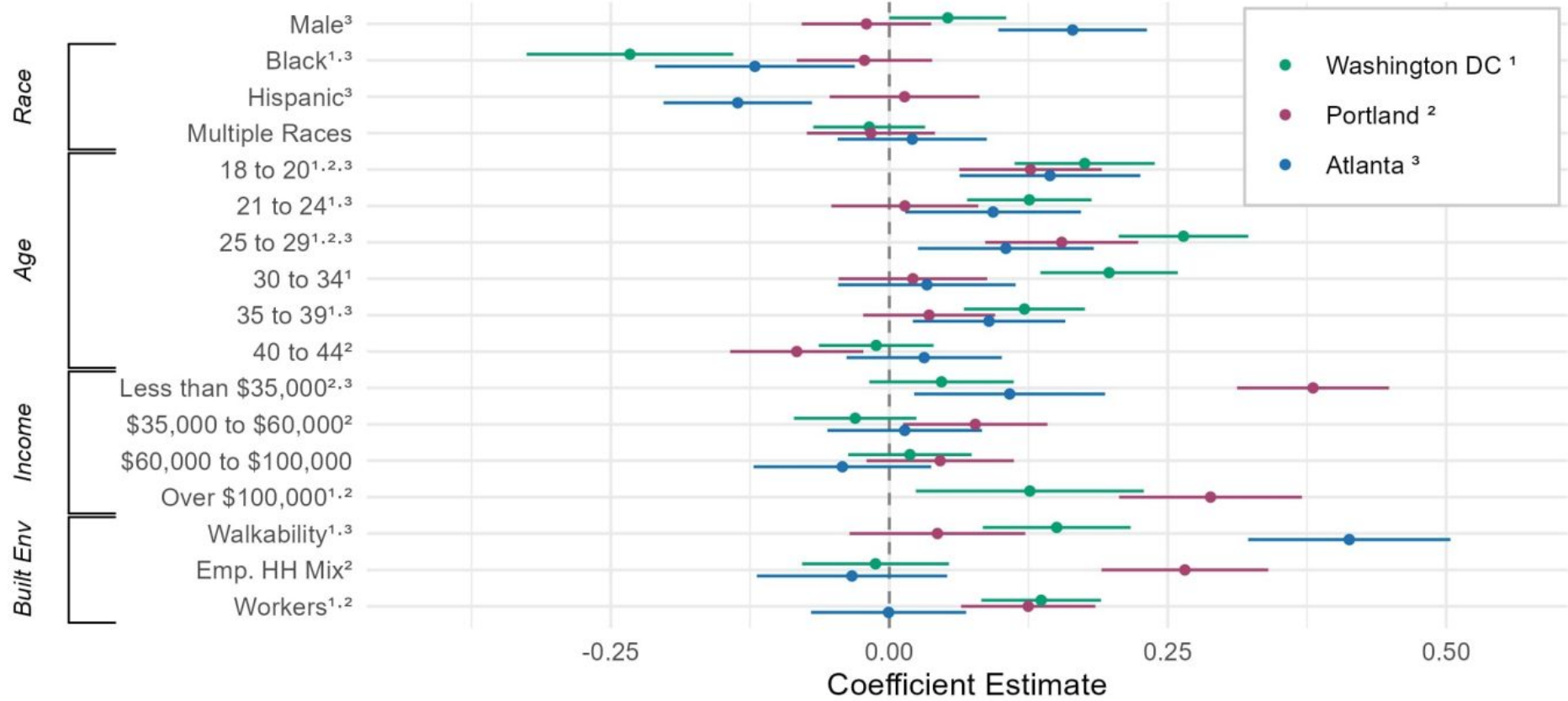
# MORAN'S EIGENVECTOR SPATIAL FILTERING



	Model	R <sup>2</sup>	AIC	Adj R <sup>2</sup>	RMSE	EVs
Washington, DC	Linear Model	0.56	942	0.54	0.66	-
	MESF + Contiguity Matrix	0.76	720	0.74	0.49	26
	MESF + K-Nearest Neighbor (4)	0.78	697	0.75	0.47	34
	<b>MESF + Gabriel Graph</b>	<b>0.79</b>	<b>681</b>	<b>0.76</b>	<b>0.46</b>	31
	Spatial Lag + Gabriel Graph	0.71*	763	-	0.51	-
	Spatial Error + Gabriel Graph	0.68*	801	-	0.52	-
Portland, OR	Linear Model	0.40	1061	0.38	0.77	-
	MESF + Contiguity Matrix	0.69	856	0.64	0.56	41
	MESF + K-Nearest Neighbor (4)	0.67	865	0.63	0.58	31
	<b>MESF + Gabriel Graph</b>	<b>0.68</b>	<b>851</b>	<b>0.64</b>	<b>0.56</b>	34
	Spatial Lag + Gabriel Graph	0.57*	920	-	0.63	-
	Spatial Error + Gabriel Graph	0.55*	941	-	0.63	-
Atlanta, GA	Linear Model	0.39	766	0.36	0.78	-
	MESF + Contiguity Matrix	0.79	518	0.74	0.46	40
	<b>MESF + K-Nearest Neighbor (4)</b>	<b>0.79</b>	<b>513</b>	<b>0.75</b>	<b>0.45</b>	42
	MESF + Gabriel Graph	0.79	523	0.74	0.46	41
	Spatial Lag + K-Nearest Neighbor (4)	0.67*	577	-	0.54	-
	Spatial Error + K-Nearest Neighbor (4)	0.66*	586	-	0.53	-

\* indicates Nagelkerke pseudo-R<sup>2</sup>





## All three cities:

Strong positive association with

- *Men,*
- *18-39 year olds,*
- *Lower-income populations (<\$35,000),*
- *Walkability,*





- Higher-income groups (>\$100,000) **positively** associated with usage in *Washington DC* and *Portland*
  - *Particularly for morning weekday commute*
- **Black** and **Hispanic** populations are **negatively** associated with usage in *Washington DC* and *Atlanta*
- Portland stands out (*existing policy interventions*)



# EVALUATING FREE FARE MICROMOBILITY PROGRAMS



# GRAND RAPIDS, MICHIGAN

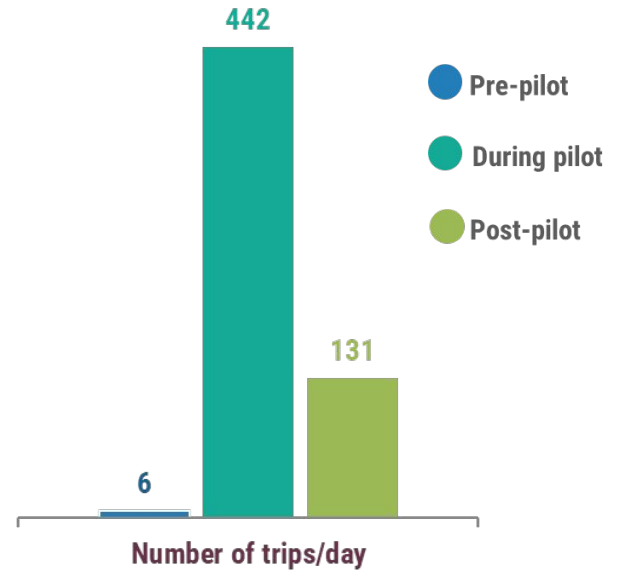




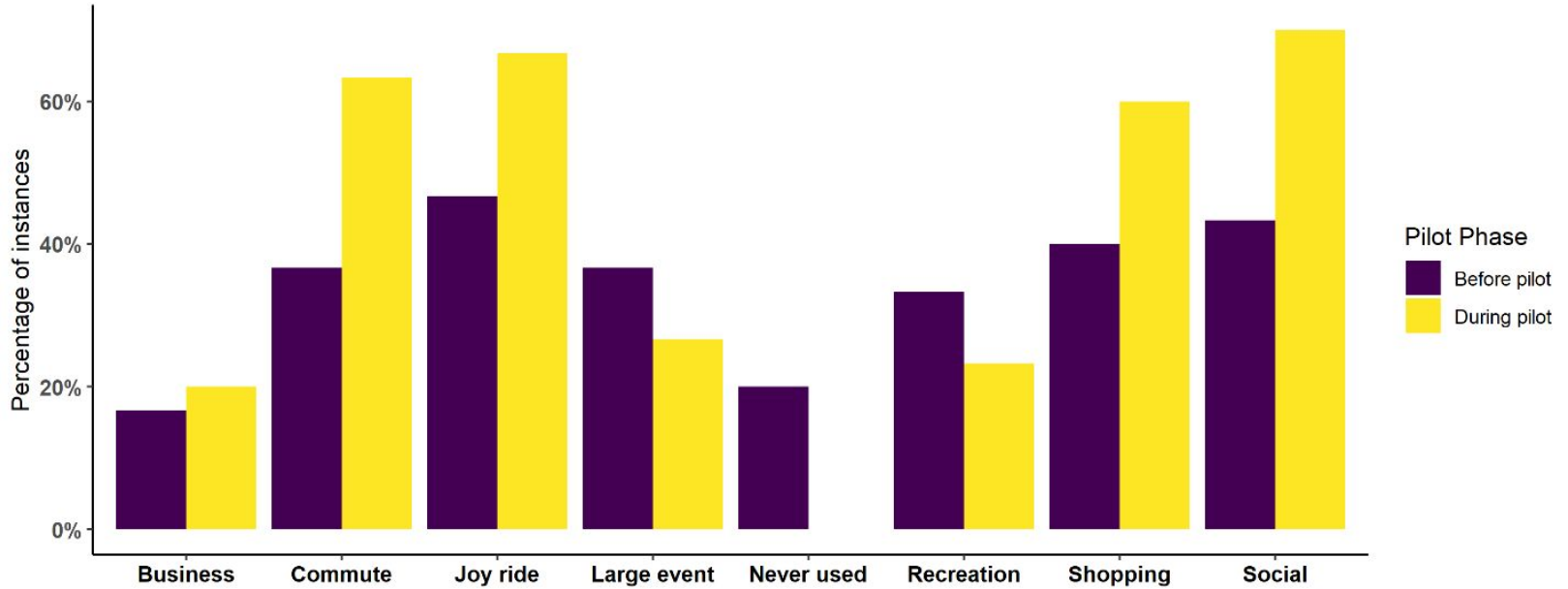
# FREE RIDES

July - September, 2024

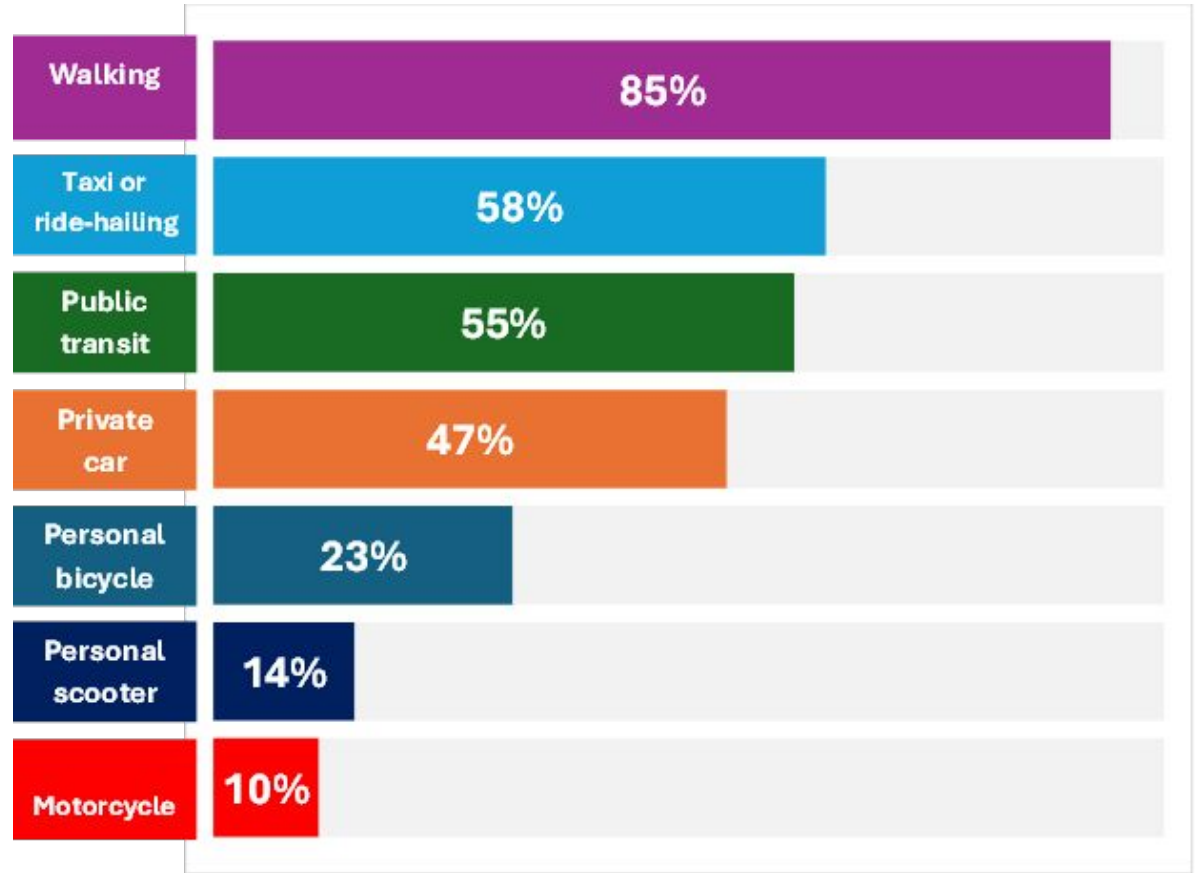
*(Enrolled in Mobility Access Program)*



# TRIP PURPOSE



# TRAVEL MODES SUBSTITUTED



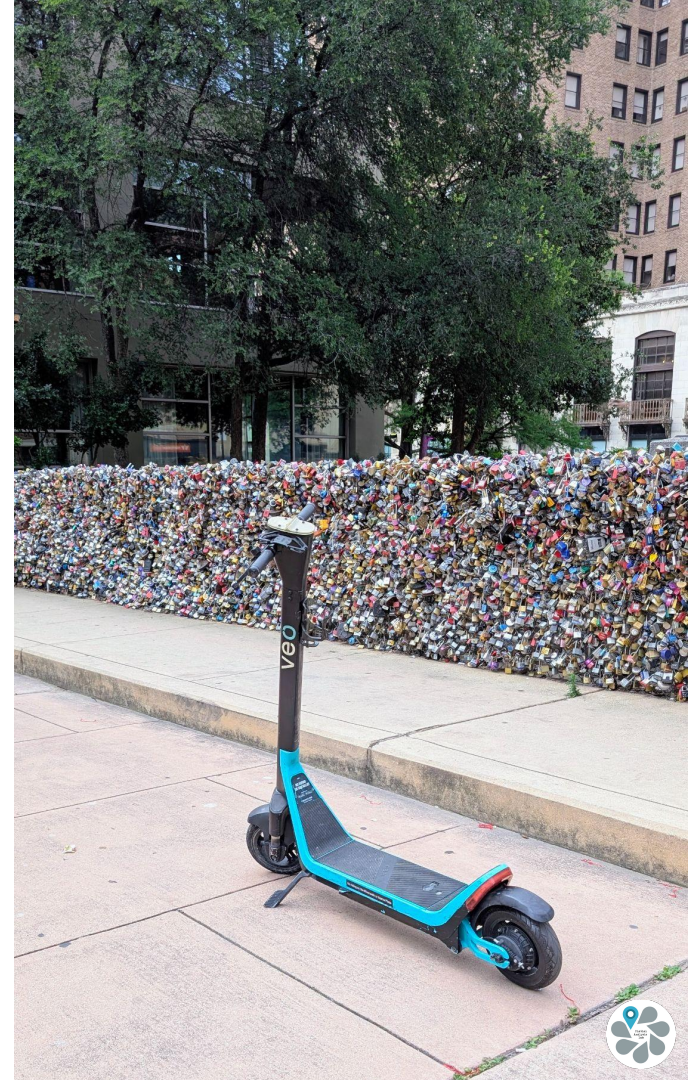
“I felt appreciated. Like, I felt more valuable...”

“...Giving transportation to so many people that really need it, just that right there shows how you're putting back in your community.”



# THE TAKEAWAY

- Understanding **mobility** is *essential* for understanding *cities* and *communities*
- **Mobility Vitality** is important for *livable* and *accessible* cities
- *E*-micromobility is a small but growing part of the **urban mobility ecosystem**
  - Offers improved access for many
  - Still has a long way to go





# PLATIAL ANALYSIS LAB

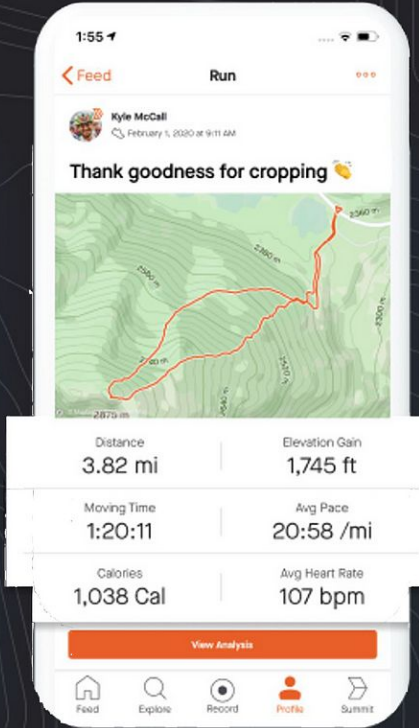
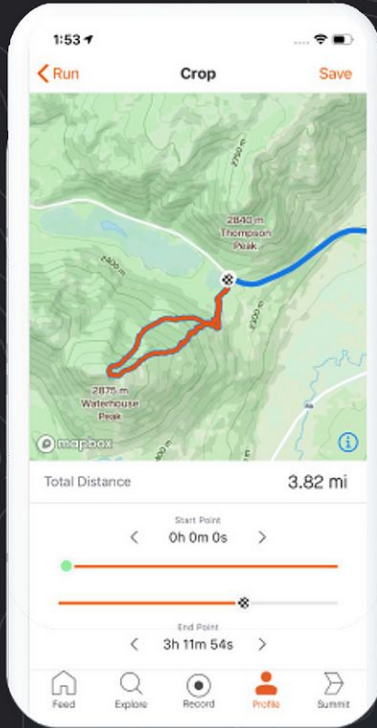
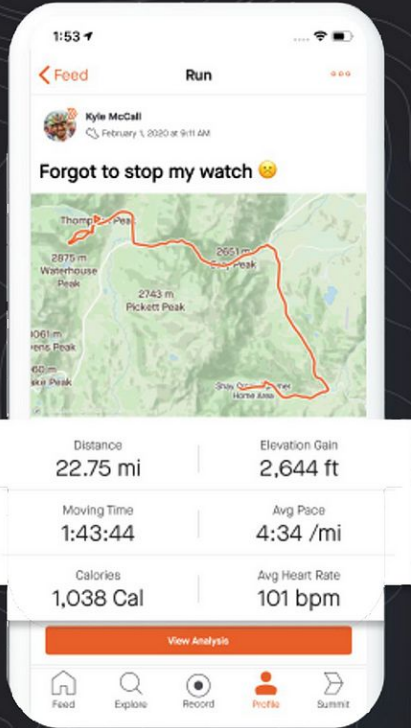


 <https://platial.science>

    @platialanalysis



# STRAVA

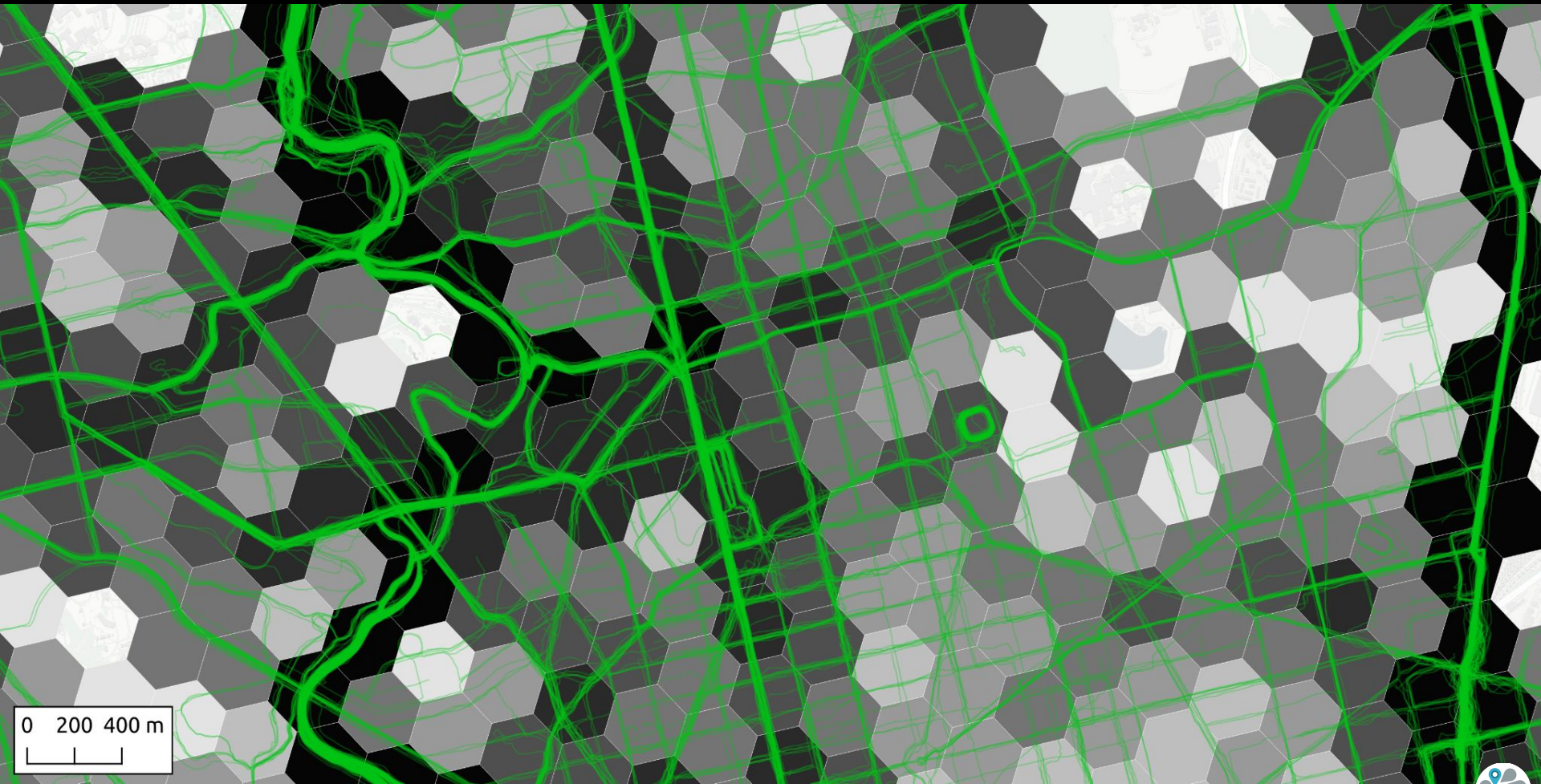


1 billion activities

100 million users

40 million activities/wk





0 200 400 m



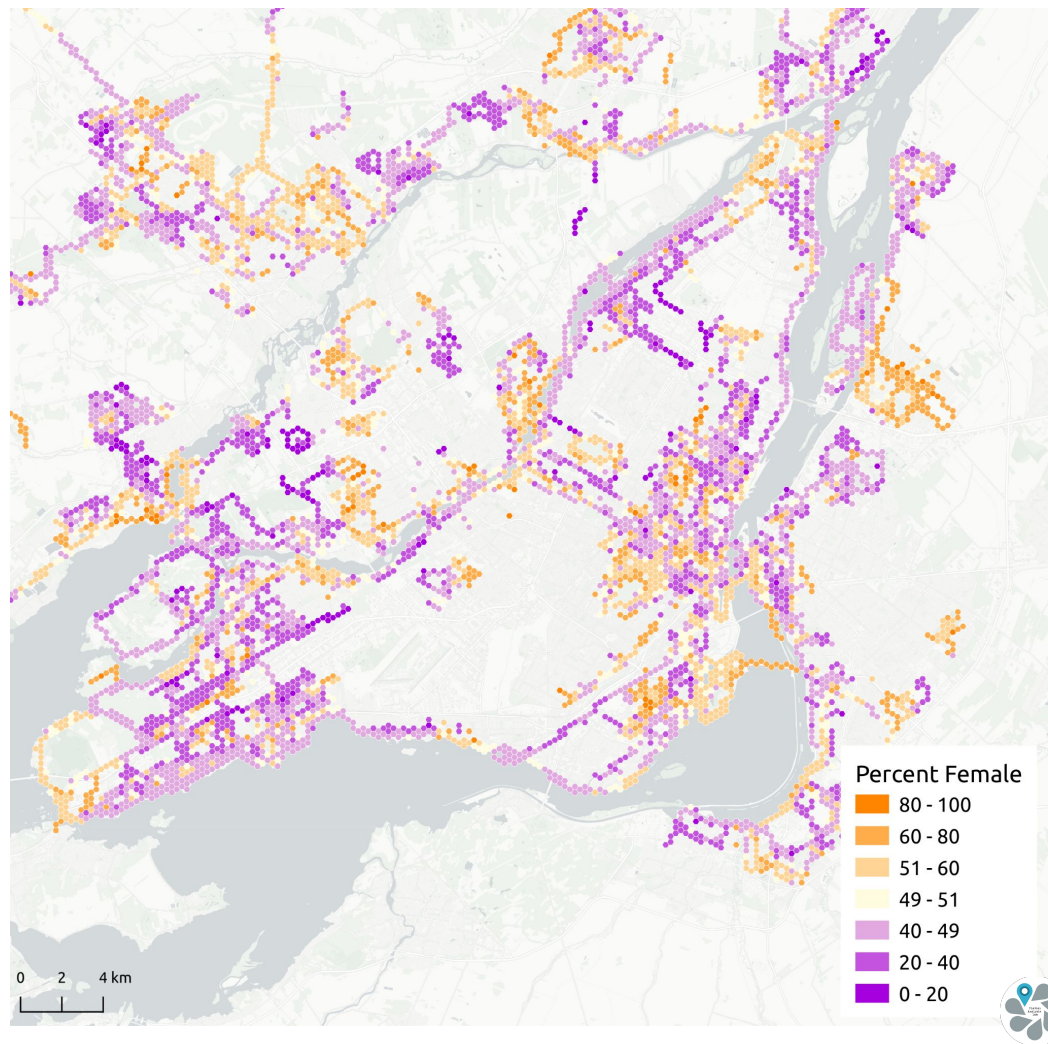
Montreal, QC



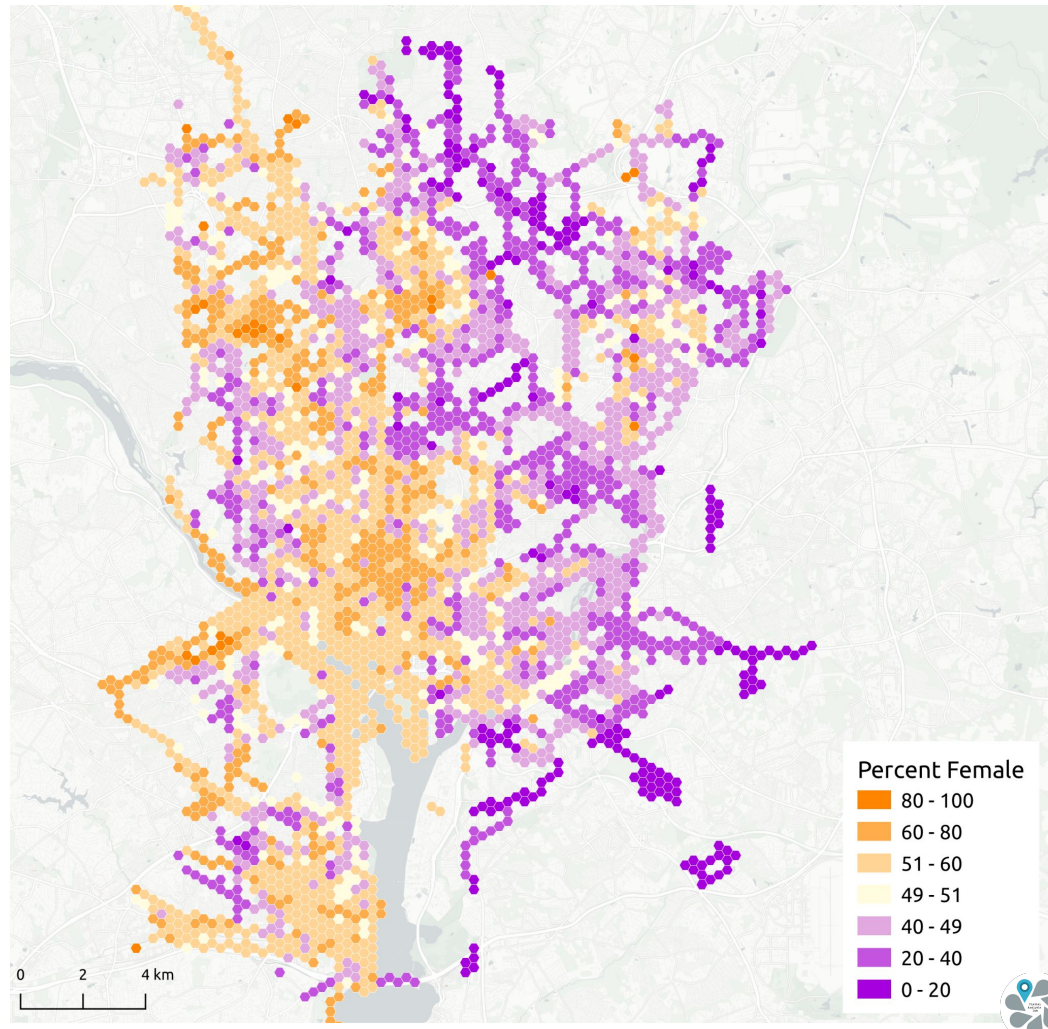
Washington, DC



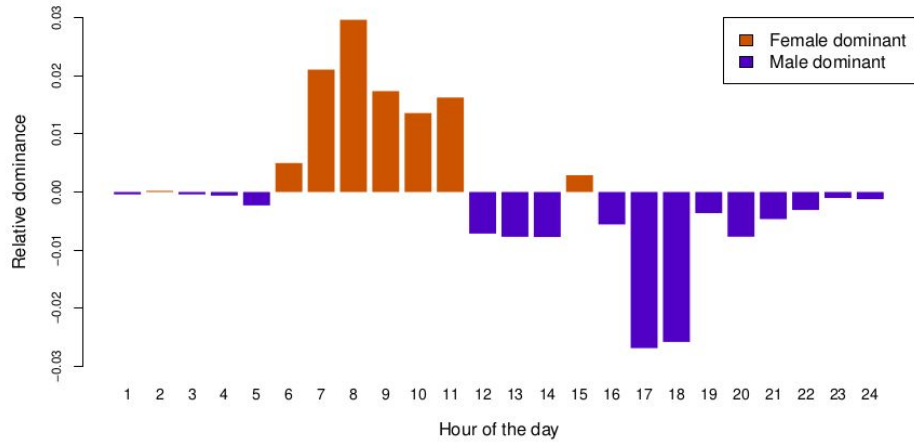
# Montreal



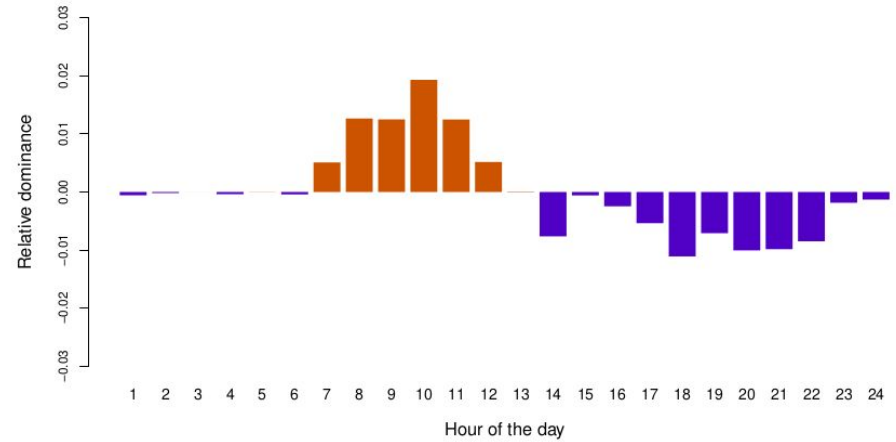
# Washington DC

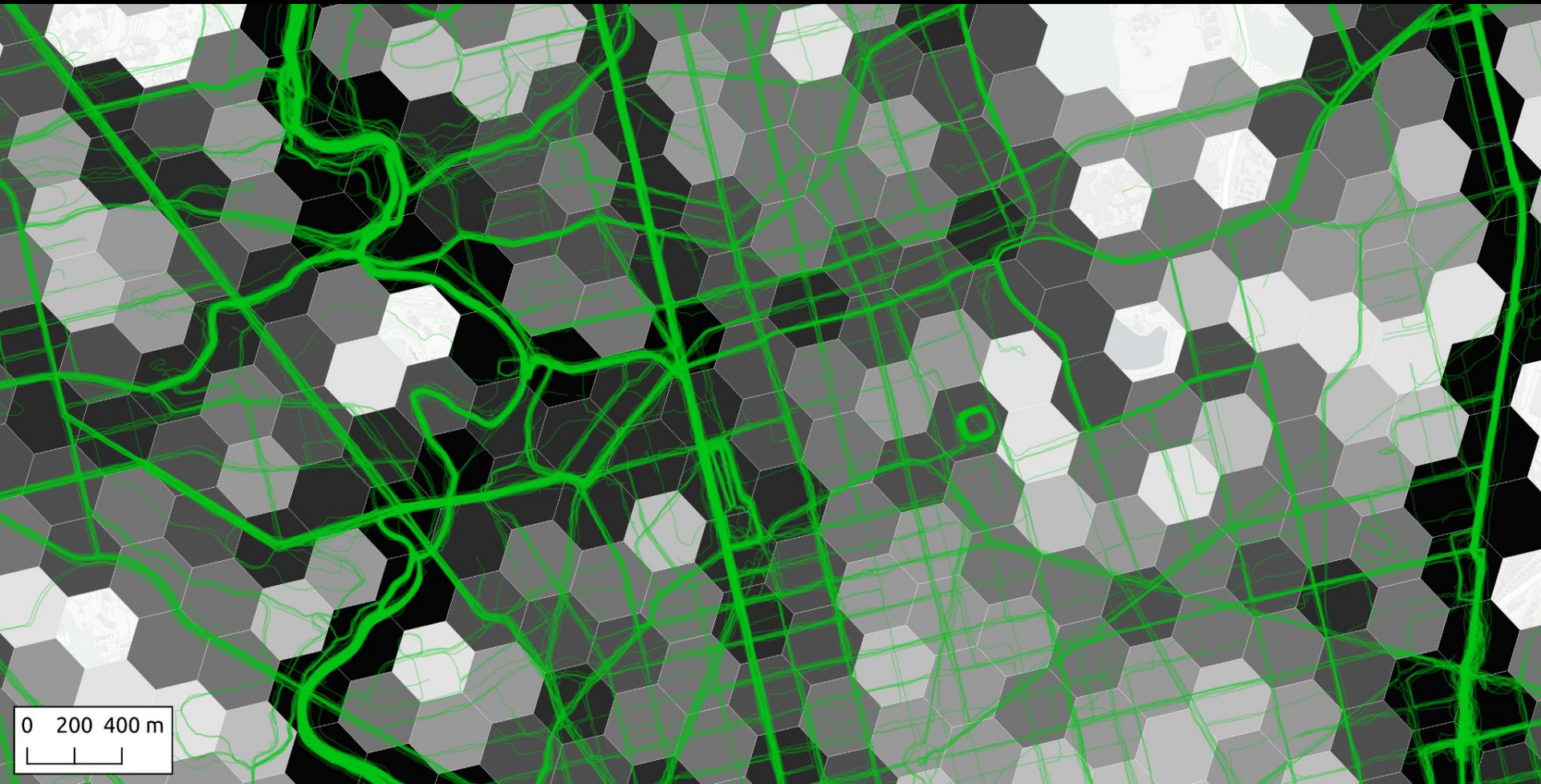


## Washington, DC



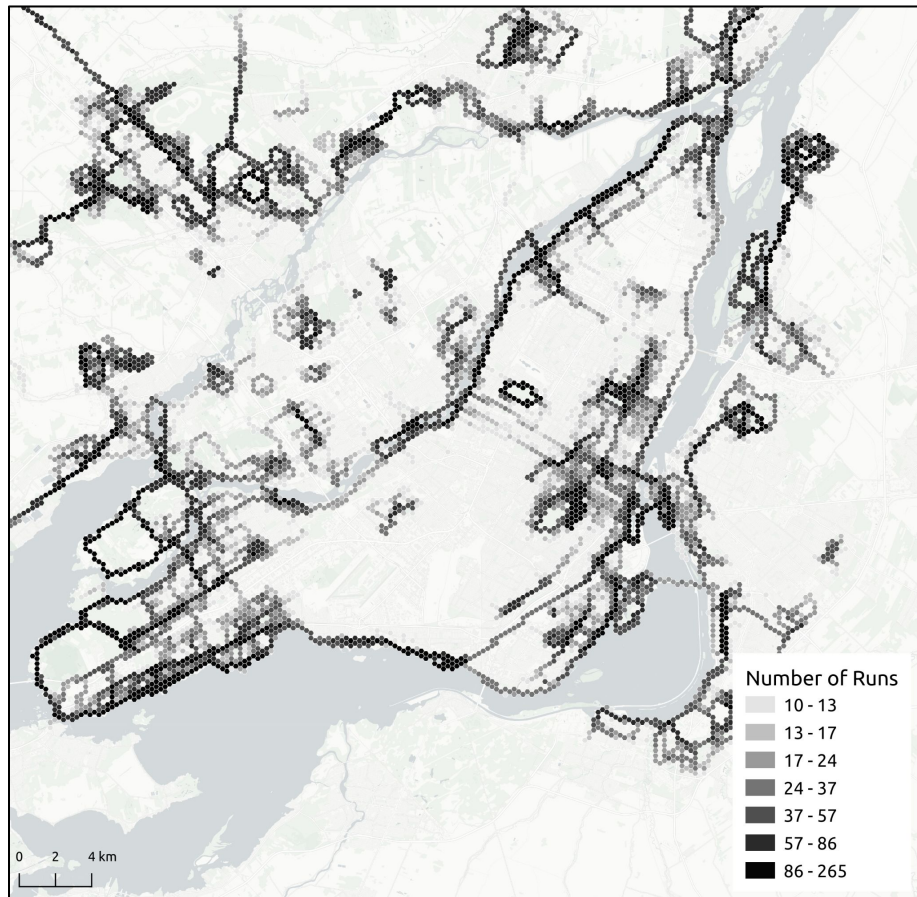
## Montreal, QC



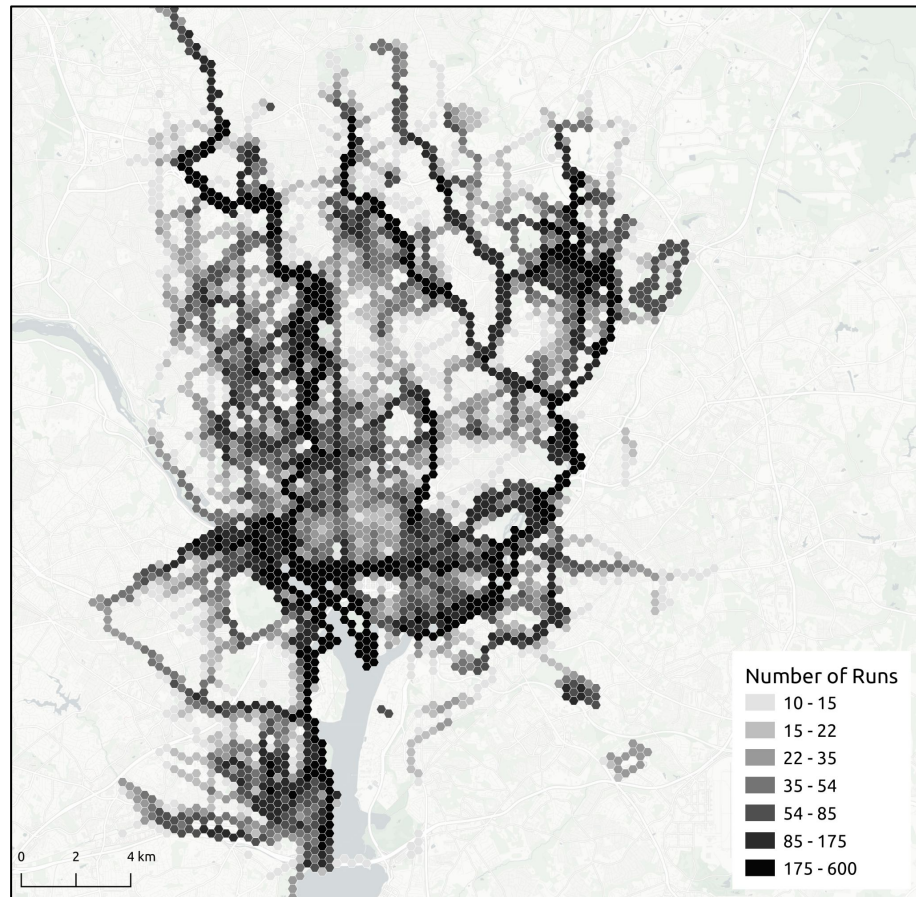


0 200 400 m

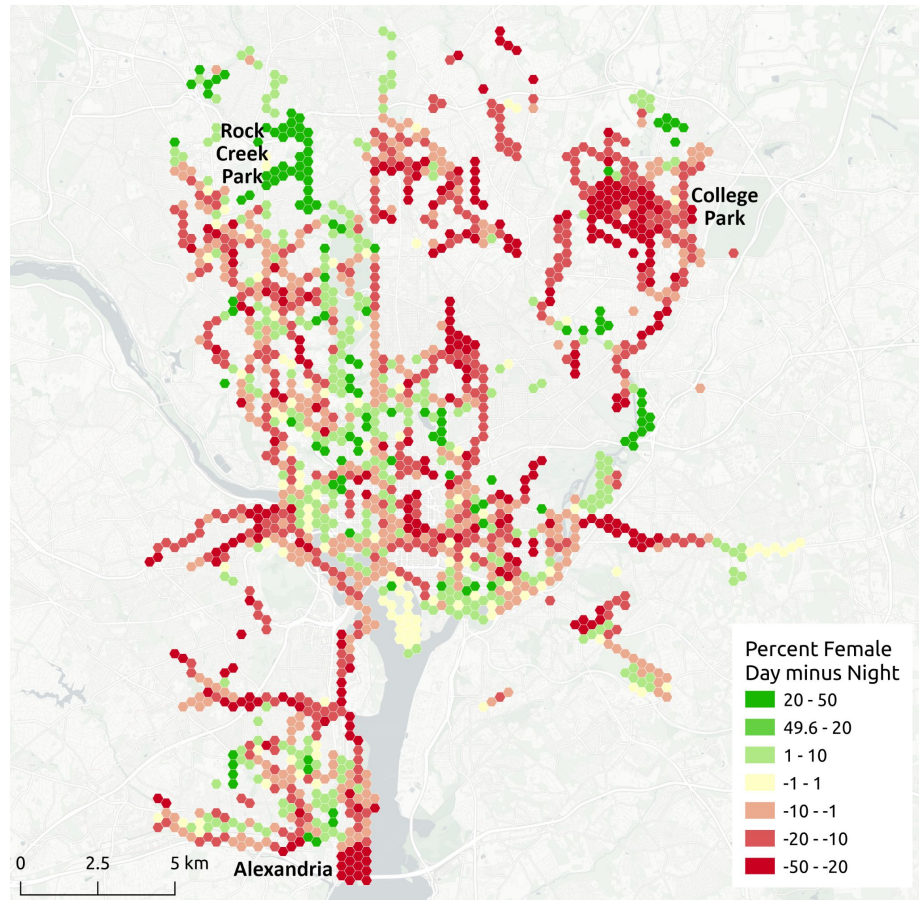
# Montreal, QC



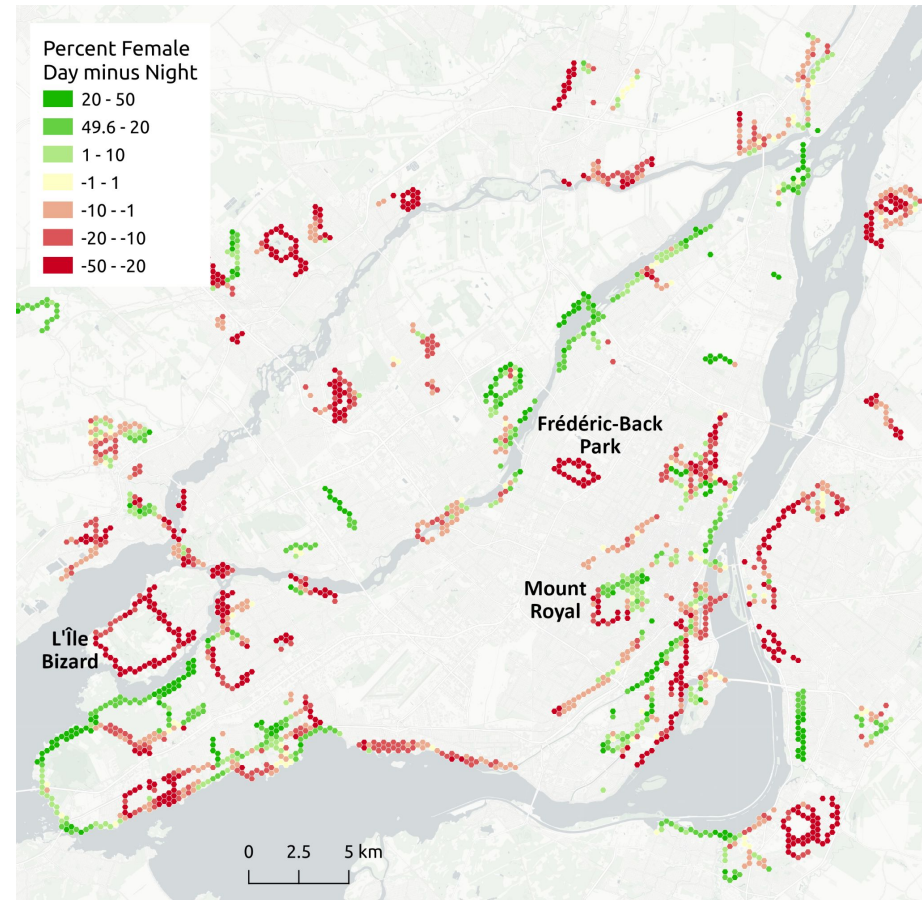
# Washington, DC



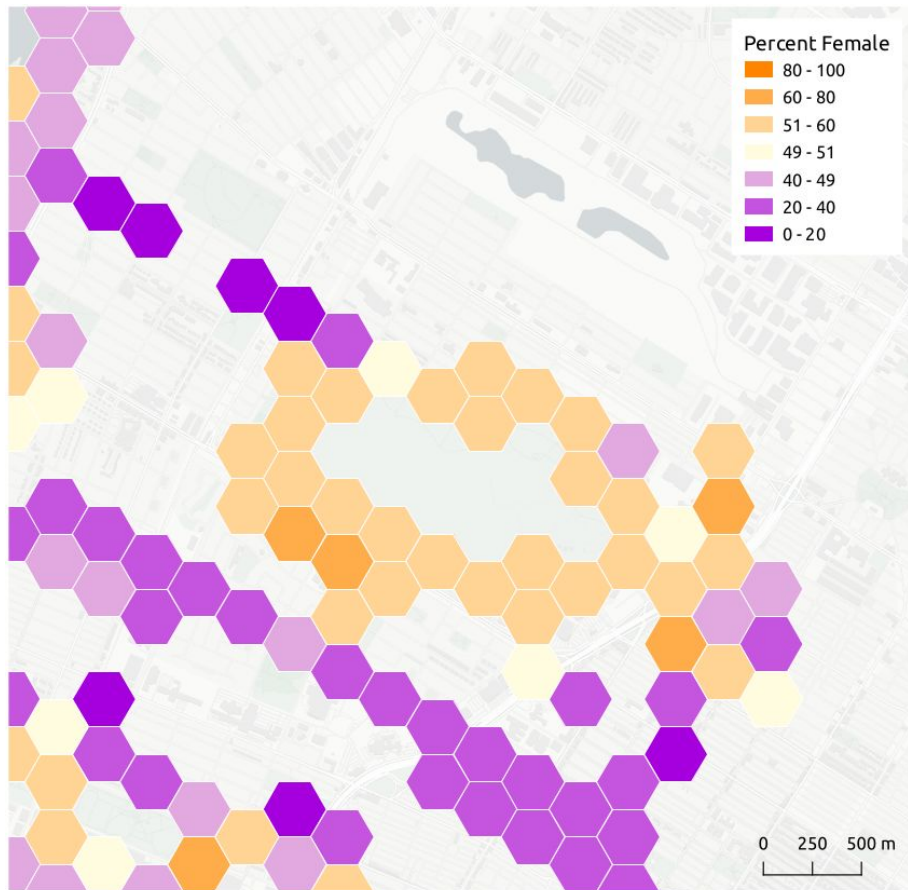
# Washington, DC



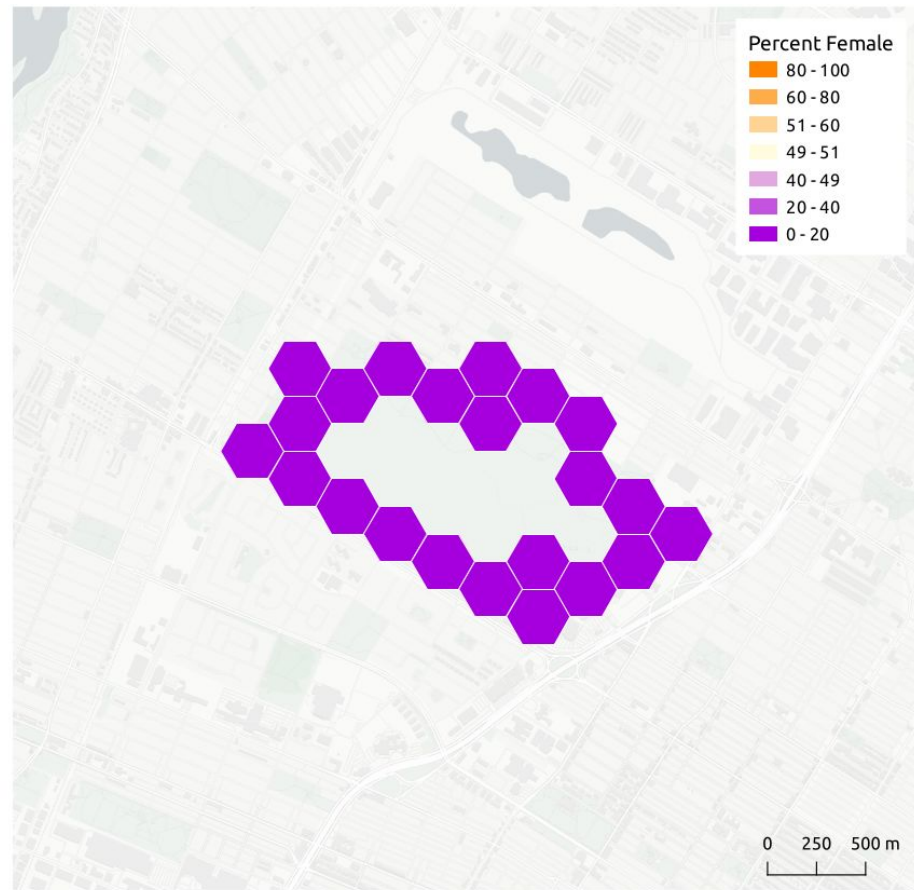
# Montreal, QC



# Frédéric-Back Park in northwest Montréal



Runs during the day



Runs at night