URBAN FREIGHT LAB
UNIVERSITY of WASHINGTON
College of Engineering

The Urban Freight Lab:

A Strategic Public-Private Research Partnership

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Our Vision

The Urban Freight Lab is an innovative partnership bringing together private industry, academic researchers, and public transportation agencies to solve urban freight management problems bringing benefits to customers, carriers, and community.

How We Work

- Engage with private sector executives and operations staff
- Engage with public sector planning and engineering
- Financial commitment from private sector
- Problems are jointly defined
- Academic analyses *and* ground-truthed tests
- Ideas *and* evaluations, analyses, and tests

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Public Sector

City Transportation Departments

Seattle Department of Transportation

City of Bellevue Washington

New York City DOT

Private Sector

Retailers

amazon

Shippers/Carriers

PepsiCo

Cornucopia Logistics

UPS

Vehicle & Part Manufacturers

Coaster Cycles

Michelin

Ford

gm

URB-E

Infrastructure and Technology Providers

Automotus

REEF

LACUNA

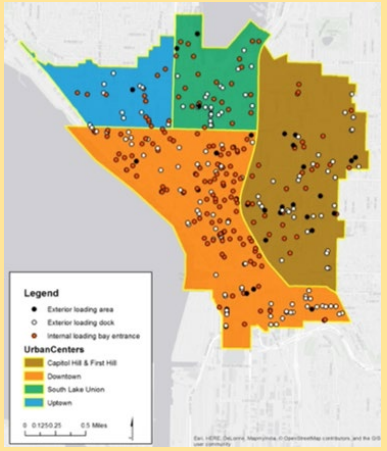
Terreno

grid

Research Building Blocks

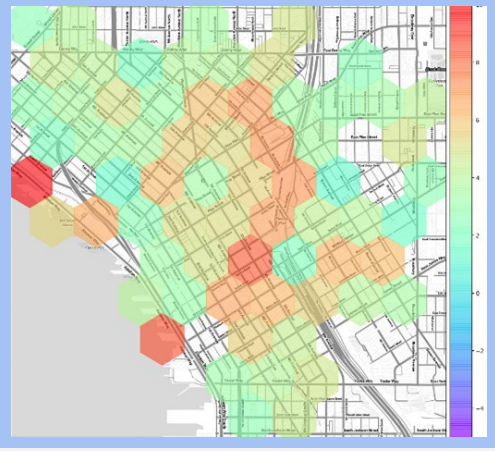
Measuring urban logistics infrastructure

- Survey private loading bays
- Measure urban alleys
- Quantify curb allocation
- Cordon studies



Quantify freight activity operations

- Curb occupancy study
- Ridealongs study
- Final 50 feet study
- Cruising for parking analysis

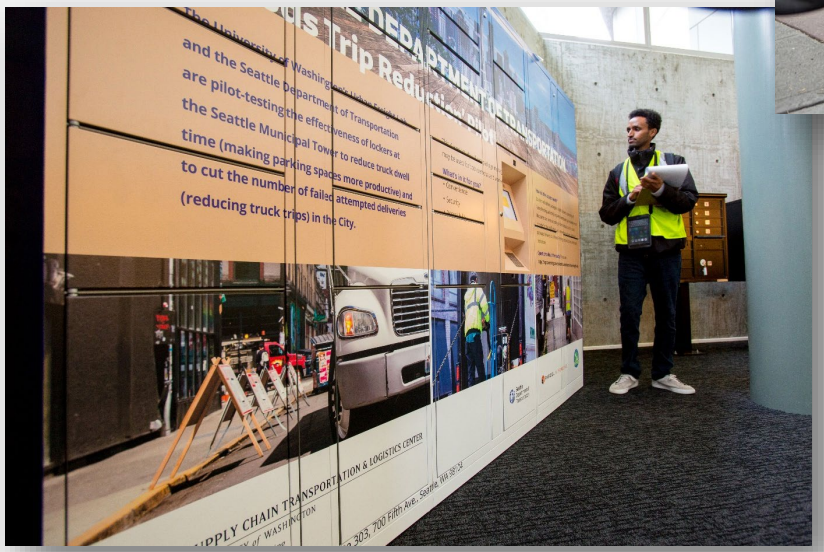


Test delivery solutions and technologies

- Common carriers lockers
- Cargo e-bike
- Parking information systems
- Geofencing for TNCs

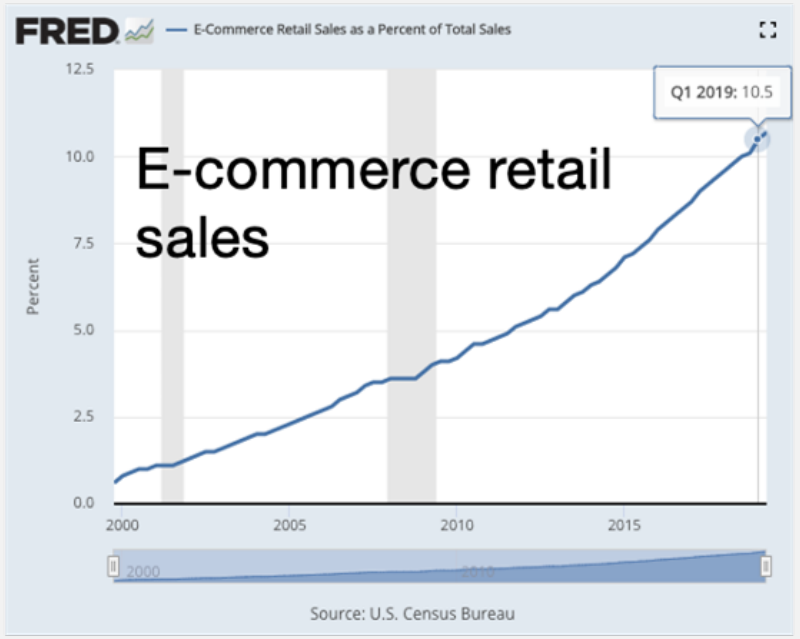
Current Areas of Research

1. Urban Goods Delivery
2. Sustainable Urban Freight
3. Curbspace Management
4. Zero Emissions Freight



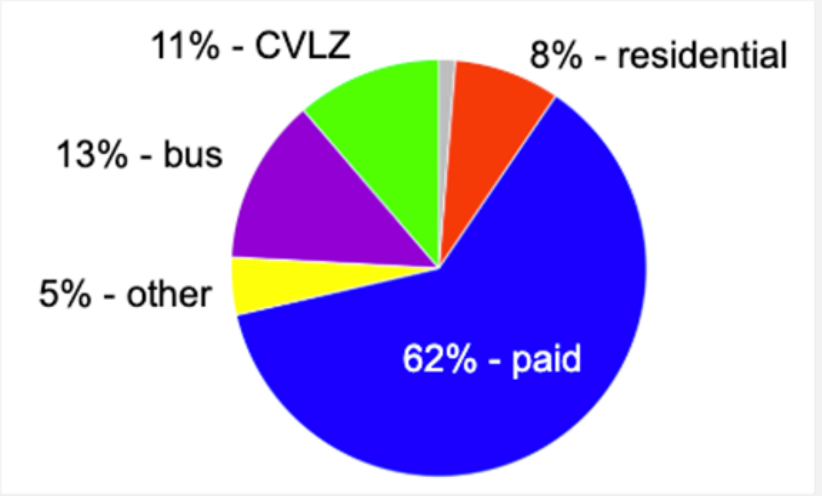
Delivering in urban areas is increasingly challenging

Freight parking demand



U.S. E-commerce retail sales represents 11.2 % of total sales (U.S. Census Bureau, 2019)

Freight parking supply



11% of allocated curb-space in Seattle is dedicated to commercial vehicles

(Seattle DOT, 2019)

How can we better manage the limited curb space?

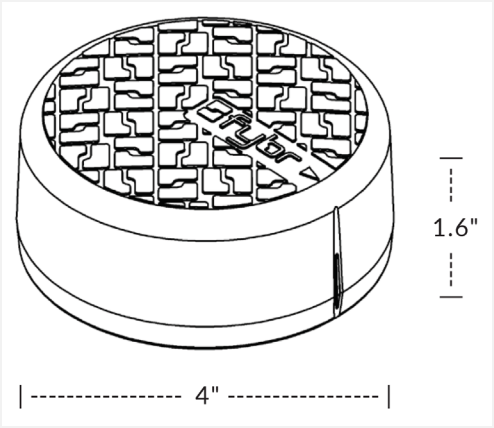
Why the Final 50 Feet is Difficult to Study

- Lack of data on curb and load/unload spaces inventory
- Lack of data on delivery operation and driver behavior statistics
- Trust issues in data sharing from private mobility and logistics companies
- Lack of research and methods to measure delivery operation and curb/space utilization performance
- Increasing competition for limited curb space
- Security concerns associated with private buildings
- Lack of collaboration between public and private sectors

Department of Energy Curb Project

Can parking information improve delivery efficiency?

- Belltown neighbourhood, Seattle
- 273 magnetic field sensors
- CVLZs + PLZs

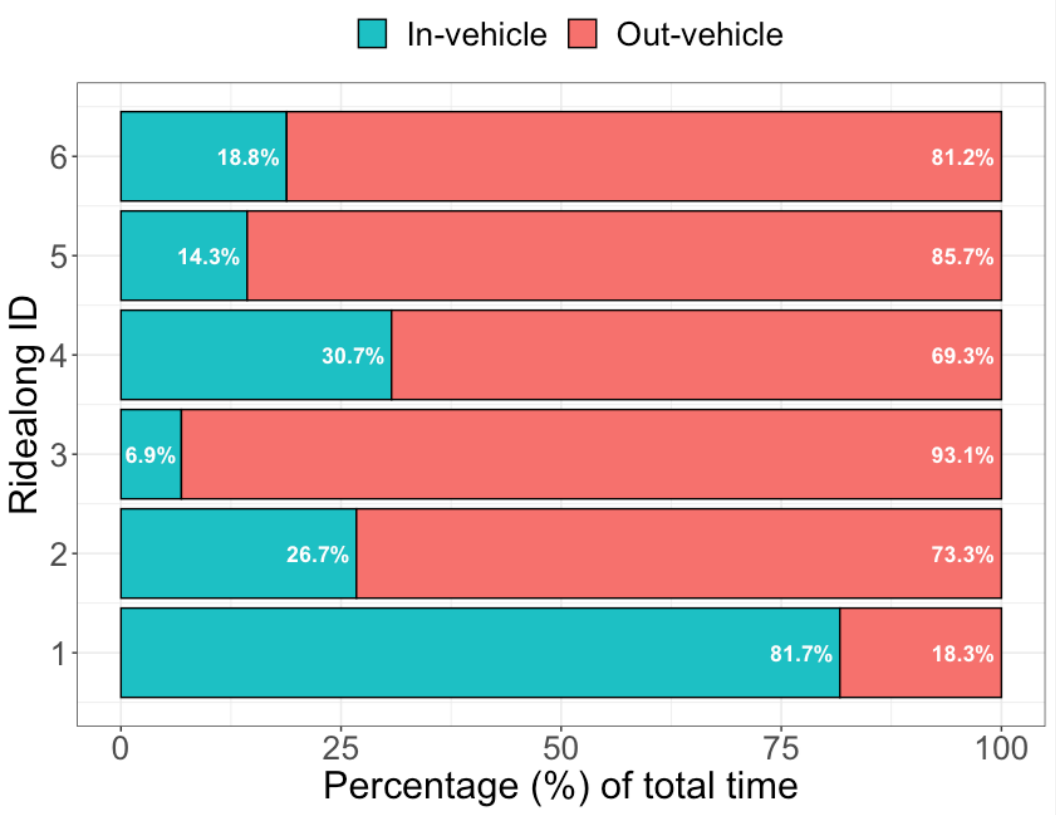


Sensor

Deployment

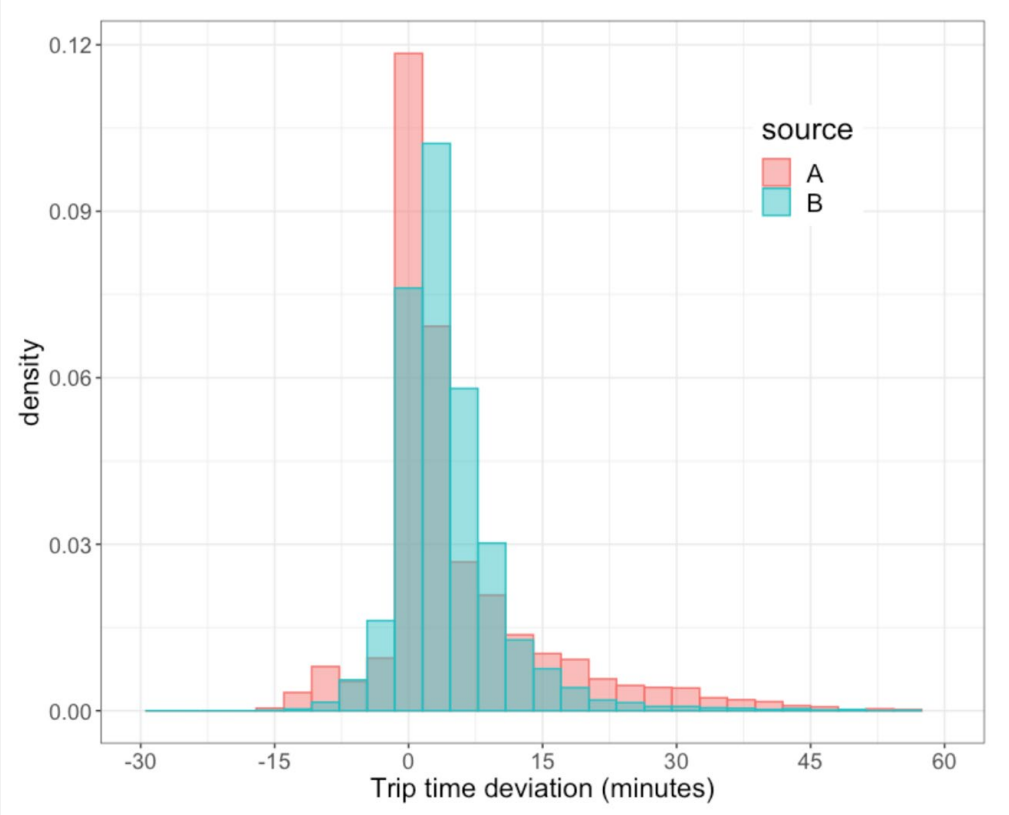
Gateway

How delivery drivers use the curb



80%

Time a delivery driver spends out-of-vehicle



1 hour/ day

Time spent cruising for parking

Common Microhub Pilot: Seattle Neighborhood Delivery Hub

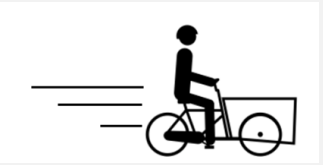
A collaboration between the Urban Freight Lab, Seattle Department of Transportation, AxleHire, Coaster Cycles, BrightDrop, REEF.

- Objectives set by project team
- Assessed the performance of delivery microhub and cycle logistics in comparison to truck deliveries
  - VMT per package
  - Tailpipe CO_2 emissions
  - Time spent per package

Common Microhub Pilot: Results

- VMT: E-bikes halved VMT per package compared to trucks
- Emissions: E-bikes reduced tailpipe emissions by 30% compared to trucks
- Time spent per package: Maintained
- 10 trucks could be replaced by seven e-bikes

How cargo bikes use the urban transport infrastructure?



Time spent… **Driving** **Parking**	 20% 80%	 40% 60%
Parking dwell time	17.6 min.	4.3 min.
1 delivery per stop **2+ deliveries per stop**	33% 67%	73% 27%
Walking distance	54 meters	32 meters

80% Time spent parking on sidewalks

37% Time spent riding on sidewalks

What is the "right" infrastructure to safely deploy cargo bikes at large scale?

Other active research projects

- Urban Goods in 2030 (UFL project for the year)
    - Electrifying freight
    - Microfreight
    - Digital transformation
    - Planning for streets and people
- West Seattle Impact Shed Shopping Behaviors Survey
- Curb Management for commercial vehicles through simulation (multiple projects)
- Cargo Bikes
- Equity Impacts on Freight

Questions?

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