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
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

E-commerce retail sales

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 CO2 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?

<table>
<thead>
<tr>
<th>Time spent…</th>
<th>Driving</th>
<th>Parking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20%</td>
<td>40%</td>
</tr>
<tr>
<td></td>
<td>80%</td>
<td>60%</td>
</tr>
<tr>
<td>Parking dwell time</td>
<td>17.6 min.</td>
<td>4.3 min.</td>
</tr>
<tr>
<td>1 delivery per stop</td>
<td>33%</td>
<td>73%</td>
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<tr>
<td>2+ deliveries per</td>
<td>67%</td>
<td>27%</td>
</tr>
<tr>
<td>stop</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking distance</td>
<td>54 meters</td>
<td>32 meters</td>
</tr>
</tbody>
</table>

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