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Demanding Change / Changing Demand

CITE Annual Meeting - Edmonton

June 5, 2018

Planning for Cars

- **Planning and designing for cars for 70-80 years**
  - We still have traffic
  - A drain on:
    - **Environmental health**
    - **Physical health**
    - **Fiscal health**

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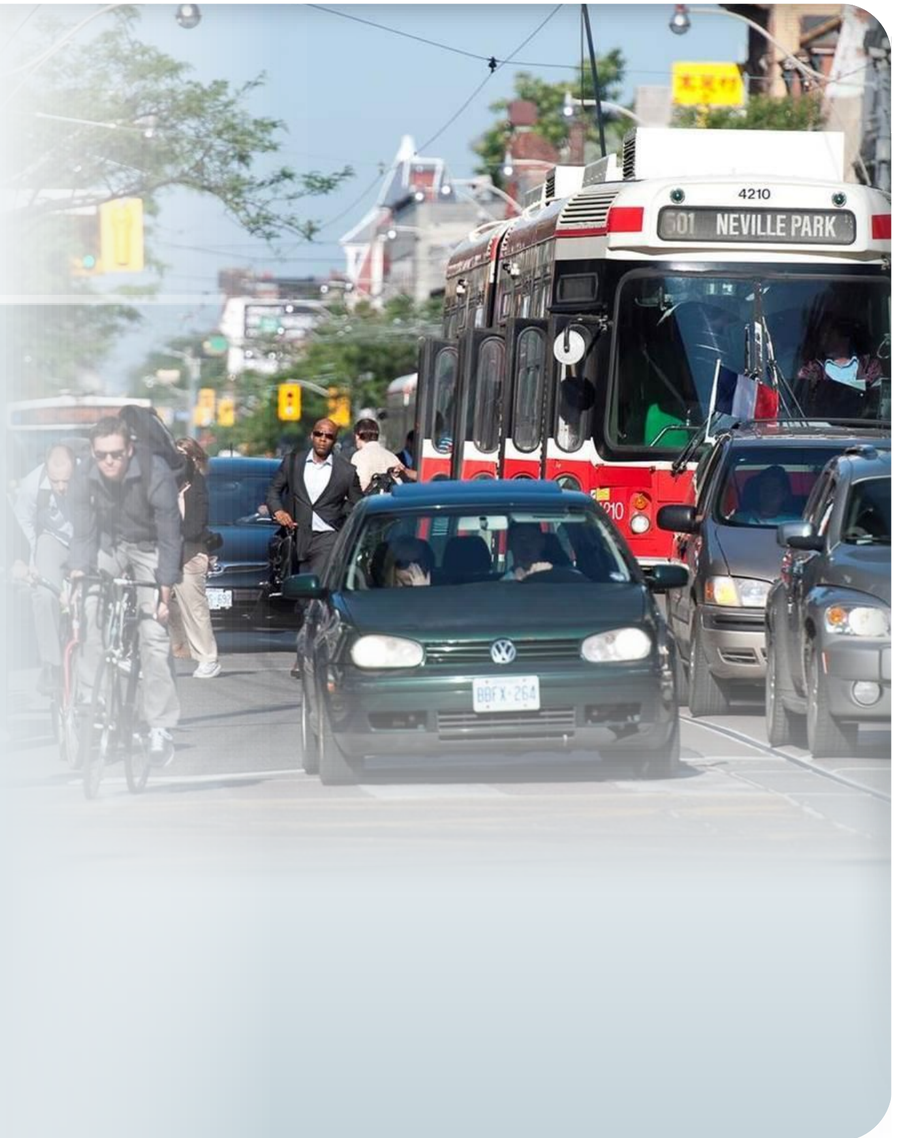
Change is Afoot

- **Policy directions are changing**
  - Sustainable Transportation / Complete Streets / Integrated Mobility
- **Technology is changing**
  - Smart phones
  - Automated vehicles
  - Mobility Services
- **Lifestyles are changing**
  - Increasing urbanity
  - Reducing rate of driver's licenses



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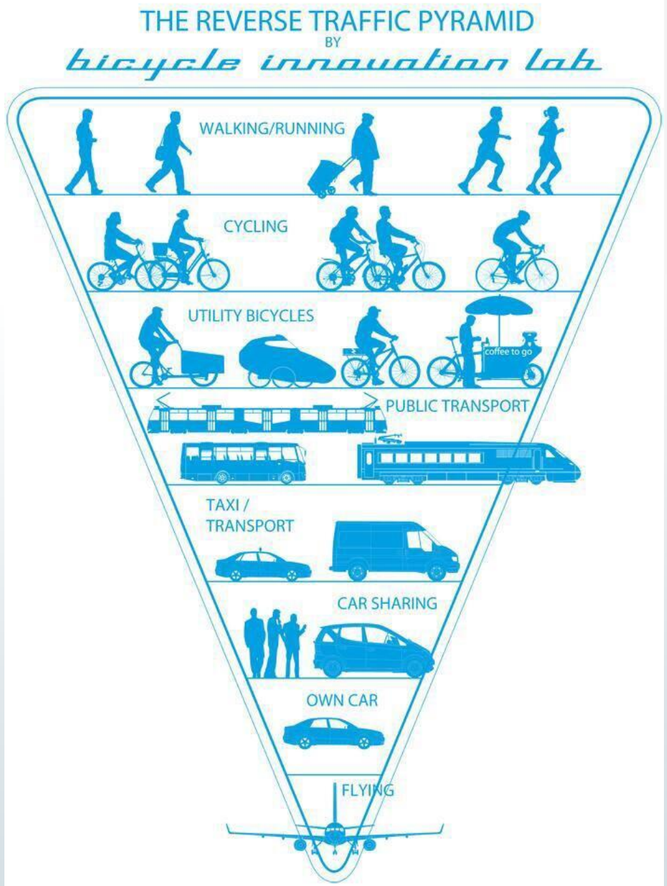
What does this mean?

- **Planning / designing for everyone**
  - Working with urban planners / designers
  - Inverting the priority pyramid
  - More bike lanes, more pedestrian space
  - Measuring different things
- **Citizens and governments are demanding change**
  - We need to change how we forecast and measure demand



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Integrated M

- **CUTA Definition:**
  - *"**The ability for people to** **own needs.**"*
- ***From Dillon's perspective, w***
  - ***Travel Choices** - Who travel* *and how to influence it;*
  - ***Connected Modes** - How peo* *those modes, and how to mak*
  - ***Livable Communities & Street** *each other, and how to design*

Forecasting Demand

- **Estimating the demand for *all travel modes* for a city, new development, new business**
- **The root of all transportation planning analysis**
  - From TIS to TMP
- **Get this wrong and you get it all wrong**

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Focus Areas

- **Input: Data needs to be better, data needs to be better understood**
- **Processes: Four step modelling is dead (long live four step modelling)**
- **Detail: Moving people, not just cars**
- **Changes: Trends, disruptors, and lesser bullies**
- **Output: Measuring pains and gains**

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Input

Data Needs to Be Better, Data Needs to Be Better Understood

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Input

- **Traditional data collection**
  - Manual or semi-automated
  - Capital and/or resource intensive
  - Very limited locations and/or days
- **Big Data**
  - Passive collection instead of active
  - Little to no capital or resources required
  - Subscription or purchase costs

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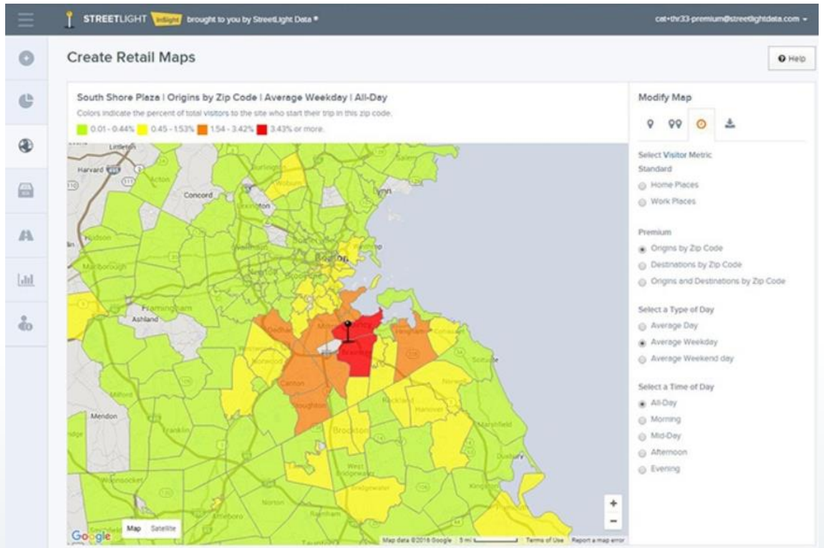
Big Data

- **Detailed collection of movement data across a large area**
  - Smartphones, GPS units, In-car GPS
- **Volume, Velocity, Variety**
- **Differences**
  - Passive vs. active collection
  - Coverage
  - Detail

Data Providers



- **INRIX**
  - GPS-based / 300 million units / cloud analytics
- **Telus / Rogers**
  - Collectors of data / tower-based
- **CellInt**
  - Cell tower-based / Intersection counts / OD by motorised mode
- **CUEBIQ**
  - Cellphone tracking (LBS) / App integration / 20%+ sample size
- **Streetlight Insight**
  - Applies INRIX and Cuebiq / web portal / Integration with PTV products
- **Ocean Protocol**
  - Decentralized data exchange / Creating data marketplace / Leverage many sources for innovation

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Challenges

- **Drinking from the firehose**
  - Rise of data providers
- **Privacy and Data Ownership**
- **Data Standards**
- **Cross-platform / Integration**
- **Costs**
  - Looks expensive, potentially large value to many groups

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Processes

Four Step Modelling is Dead, Long Live Four Step Modelling

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Processes

- **Four step modelling is dead / Long live four step modelling**
  - Generation, distribution, mode choice, assignment
  - Single trip, single mode focus
  - Not going away
- **Newer approaches**
  - Consideration of the “journey” – the full day or round-trip
  - Activity-based, Journey-based, Tour-based
  - Big challenge for smaller municipalities – time, effort, expertise
- **Traffic Modelling -> Transportation Modelling -> Mobility Modelling**

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Newer Concepts

- **Changing up the paradigm**
  - Capacity as an attractor for person trips– Active transportation and Transit
  - Capacity as a repulsor for vehicle trips
  - Integration and flexibility of modes – public to private along the journey
    - **Car share, bike share, MaaS, etc.**

Details

Moving More Than Cars

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Details

- **Moving people across many modes**
- **Historically auto-focused with % takeoffs for active, maybe a transit model**
- **Focus should shift to understanding people – huge variety of needs, wants, abilities**
- **Three levels of extra detail**
  - People
  - Modes
  - Evolution of both over time

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People

- **Hugely complex set of considerations**
  - Age, marital status, dependents, education, income, occupation, ethnicity, dwelling type, urban / suburban / rural
- **Data is sparse or aggregated**
  - Census, household activity surveys
- **Agent-based simulation**
  - Understand the aggregate of individuals
  - Mainly academic currently
  - Requires population synthesis – fill in the gaps
    - **DIY programming, Doppelganger, Prizm5**

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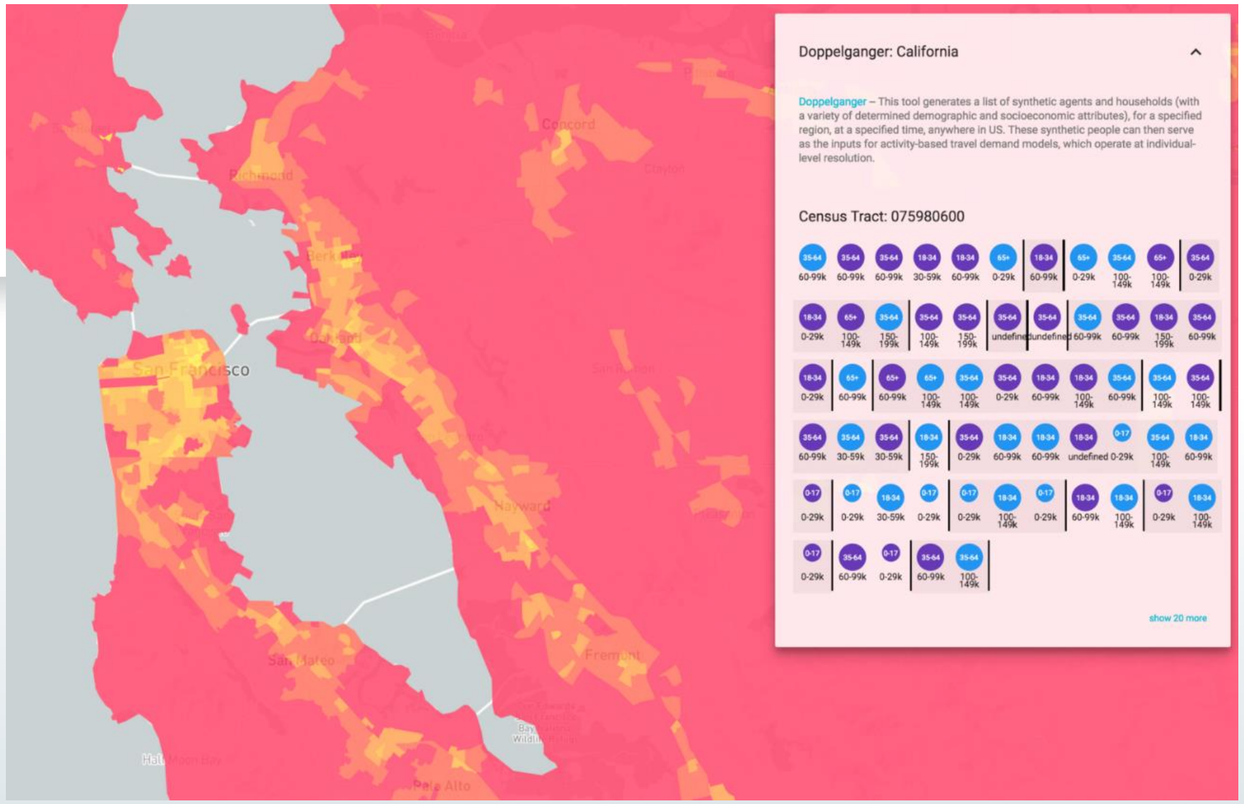

Sidewalk Labs - Doppelganger

Environics – Prizm5

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Modes

- **Ever increasing number of ways to get around**
- **Ever increasing fluidity / flexibility between modes**
  - Mobility as a Service, bike share, car share, public and private service providers
  - Freedom through velocity < Freedom through choice
- **No longer able to take auto demand +1-2% per year**
- **How to project uptake on new modes?**

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Changes

Trends, Disruptors, and Lesser Bullies

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Changes

- **Used to be: observe trend, project straight line**
  - Increasing flexibility, options, desire for non-auto options
- **Urbanisation is a key driver in new technology development and adoption**
  - Limited space, need increased efficiency and flexibility
- **Areas of disruption**
  - Smartphones, MaaS, Connected/Automated Vehicles – what's next?

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Fuzzier and Fuzzier

- **Trends are increasingly shaky**
  - Walking – millions of years; horses – thousands; bikes – hundreds; cars – decades; CAVs - ?; jet packs - ?
- **Need more fuzz to our predictions**
  - Ensemble modelling – intertwining independent algorithms
  - Large-scale sensitivity testing – best to worst case for many variables
- **Backcasting – set goals, identify steps required and milestones**

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The Messy Middle

- **Adoption rate of new technologies will vary**
  - Region to region, urban to rural, etc.
  - E.g., connected / automated vehicles; Uber
- **Increased presence of private mobility providers**
  - What if they disappear?
- **Need to establish resiliency and redundancy in the system**

Outputs

Measuring Pains and Gains

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Outputs

- Measuring pains and gains
- Traditionally just cared about delay to motorists
- Moves to transit, active modes
- Need to be able to quantify cost/benefit, measure improvement
- Need to be able to prioritise competing interests

Multi-Modal Level of Service

- **Examine the full range of modes**
- **Alternatives will have +/- for every mode**
- **Need defined priorities, tradeoffs are inevitable in urban areas**
- **No industry standard yet**
  - Is this bad?
  - Municipal soul-searching vs. off-the-shelf ideas

SCENARIO: Chain Lake Drive - Existing Condition - AM Peak Hour					
Area Type: Inner Suburb					
MODE					
CHAIN LAKE / DAIRY QUEEN - Signalized 4-Way					
Target	C	C	C	E	E
Actual	D	D	B	C	C
Priority Corridor	No	No	No	No	No
Space	Number of conflict points	Priority Treatments	% Dedicated Lanes of Ideal	Avg. Effective Curb Radius	Number of auxiliary lanes
	8	Mixed Traffic		11 >	1 - 2
Environment	Avg. Crossing Width (m)	Intrastructure Complexity	Transit Movement V/C	Truck Turn Prohibitions	Turn prohibitions
	17.5 - 21	15 - 17	< 0.60	0	0
Time	Walk % of Cycle (s)	Cycle Length	Transit Movement Delay	Intersection Delay (sec)	Intersection Delay (sec)
	< 35%	76 - 90	21 - 35	21 - 35	21 - 35

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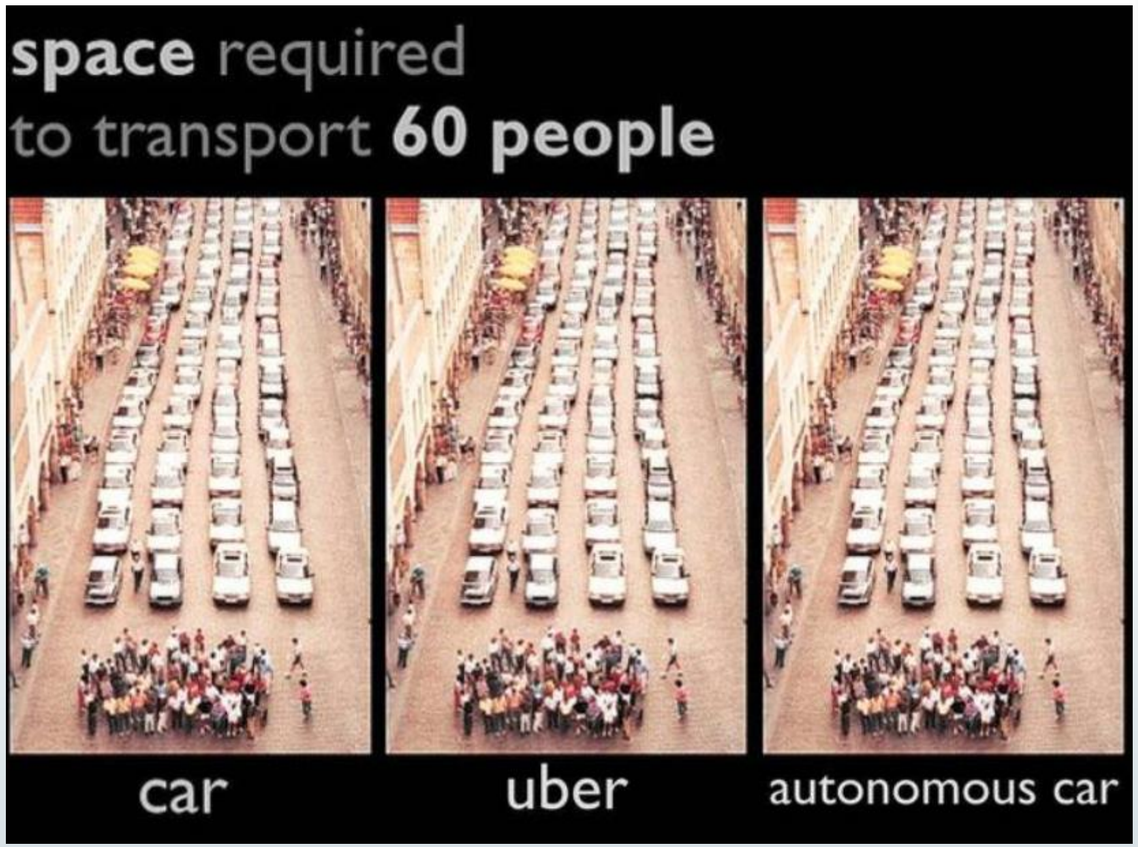
Person-Capacity

- **Limited urban space**
  - Cars are space hogs
- **Focus on movement of people**
  - 10 seconds delay for 1 motorist versus 40 bus passengers



Reliability

- **Can be a key consideration in reality**
  - Increased average, but fewer big swings can be attractive
- **Requires additional scenario modelling**
  - Large scale sensitivity, microsimulation across many seeds

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Priorities

- “Measure what you care about” – Jan Gehl

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SO WHAT?

So What?

- **Need practical solutions to reach policy goals**
- **Solution must be tailored for clients**
- **“The budget needs to match the vision” (Brent Toderian)**
  - Double active transportation share? Double that budget.
- **Use the Force, Luke. Let go! (Obi Wan Kenobi)**
  - Disable the complexity: rank priorities and build for those.

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Questions?

- **Adam Lanigan, P. Eng.**
  - alanigan@dillon.ca
  - (902) 450-5015 x5048

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