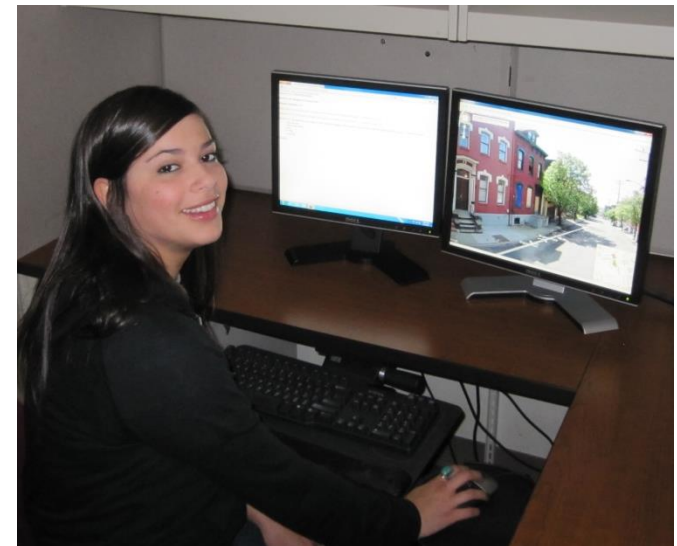


Computer Assisted Neighborhood Visual Assessment System



Stephen Mooney

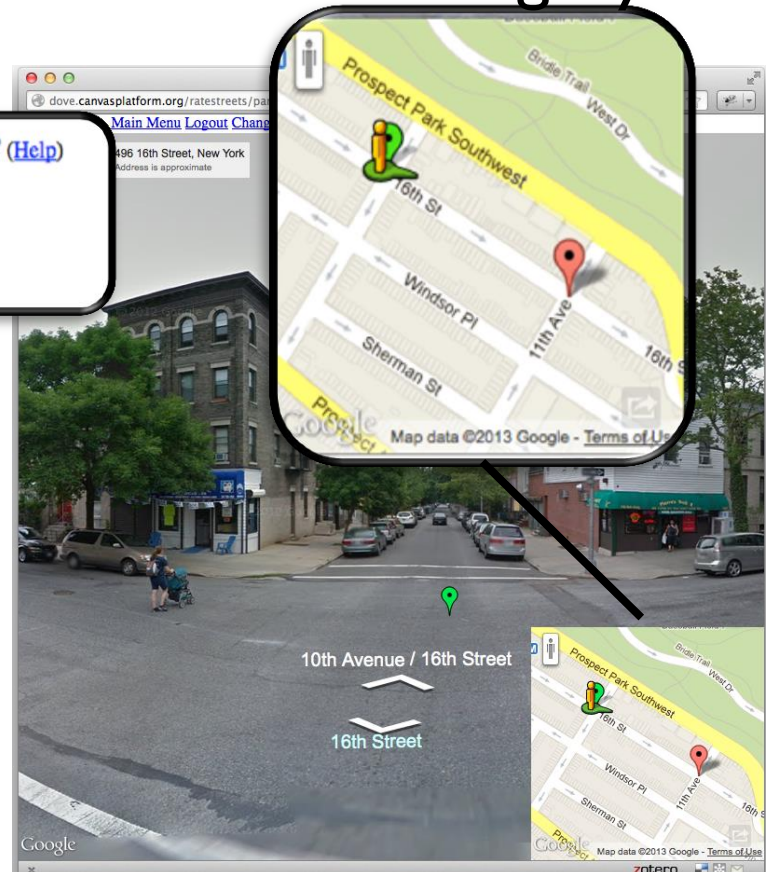
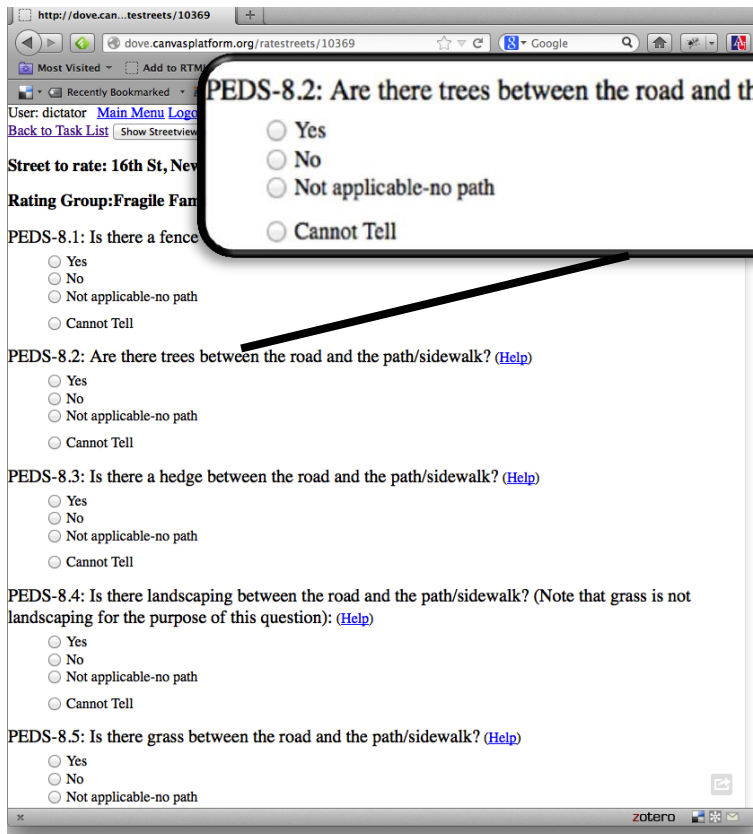
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 COLUMBIA UNIVERSITY | MAILMAN SCHOOL
of PUBLIC HEALTH

EPIDEMIOLOGY

What CANVAS is

- System for conducting *efficient* and *reliable* streetscape audits using Google Street View imagery



Using CANVAS with built environment natural experiments

- Measuring built environment exposures of interest
 - Did a policy decision to focus on fixing broken sidewalks result in more walking in a cohort of older adults?
- Measuring built environment effect modifiers
 - Where did Safe Routes to Schools interventions cause the biggest injury reduction?



CANVAS to measure *sidewalk quality*



CANVAS to measure *road lighting*

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How CANVAS works

1. Manager Interface

- Develop sample
- Assign audit protocol
- Track progress
- Assess inter-rater reliability

2. Auditor Interface

- Audit streets

How CANVAS works

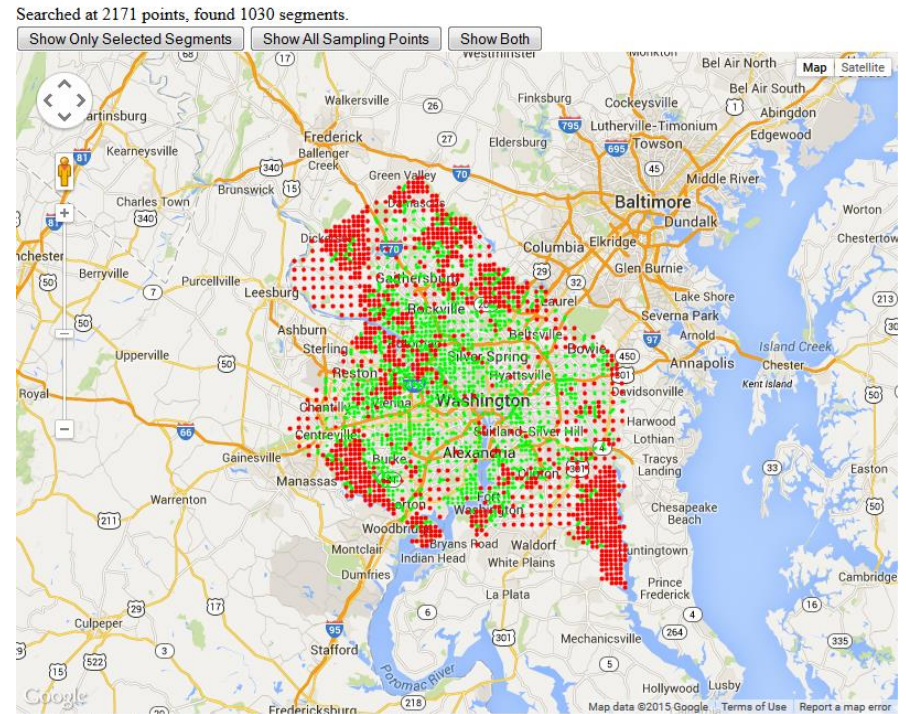
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Map of sample for DC Sample 2



How CANVAS works

1. Manager Interface

- Develop sample
- **Assign audit protocol**
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PEDS.23.3 -- Is there a median/traffic island large enough for a pedestrian to stand on? -- (Yes/No)

Minn-Irvine.8 -- Do you see any curb cuts on the block face? -- (Yes/No/Cannot tell/Not applicable - no sidewalk)

Minn-Irvine.21 -- How many lanes are there for cars (include turning lanes but not including parking lanes)? -- (1/2/3/4/5/6+/Not applicable)

PEDS.14 -- What is the condition of the road? -- (Poor/Fair/Good/Under repair)

Minn-Irvine.151 -- What kind of on-street parking is there? -- (Parallel/Diagonal/None)

—

2. Auditor Interface

- Audit streets

PEDS and the Irvine-Minnesota Inventory are built in, and the platform support custom audit tools as well

How CANVAS works

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2. Auditor Interface

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Name	Completed	Total	Complete
Canvas Platform Test	0	729	0%
Transit Access Project	1764	1764	100%
CANVAS/AMOS Training	157	252	62%
Fragile Families - Detroit	5531	5531	100%

Can also view median time/segment for each auditor, map as-yet-unrated streets, reassign tasks, and more

How CANVAS works

I. Manager Interface

- Develop sample
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- Track progress
- **Assess inter-rater reliability**

2. Auditor Interface

- Audit streets

Item	Percent Agreement	Fleiss' Kappa	# of ratings used	
Minn-Irvine.2: Consider the places that are intended for pedestrians to cross the street. Are these places marked for pedestrian crossing?	0.977	0.956	154	Analyze Agreement
Minn-Irvine.4: How is the road marked at crosswalks?	0.970	0.358	48	Analyze Agreement
Minn-Irvine.8: Do you see any curb cuts on the block face?	0.858	0.458	154	Analyze Agreement

We have found that the real-time inter-rater reliability interface is incredibly valuable for auditor training

How CANVAS works

I. Manager Interface

- Develop sample
- Assign audit protocol
- Track progress
- Assess inter-rater reliability

You are signed up to rate in the following studies:

Name	Ratings Completed	Total Ratings	Percent Complete	Actions
Canvas Platform Test	0	729	0%	Start Rating View all tasks
CANVAS/AMOS Training	4	63	6%	Start Rating View all tasks

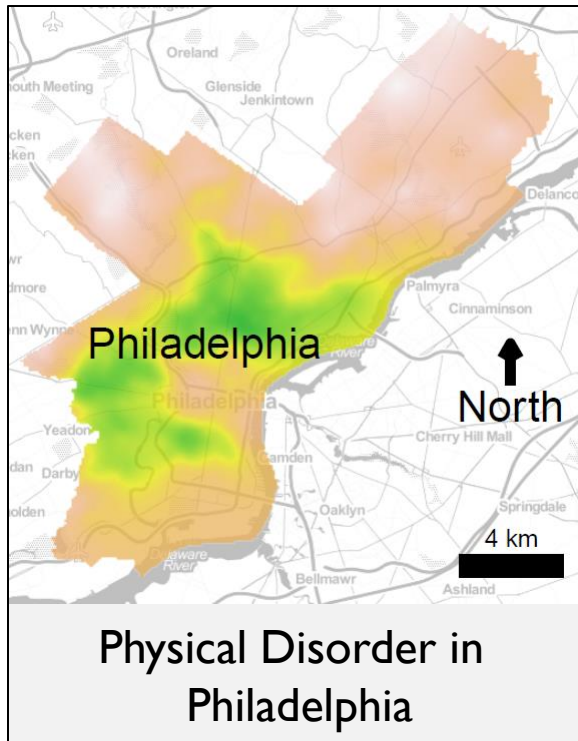
2. Auditor Interface

- Audit streets

Auditors see a simpler interface that only allows choosing a street audit task from the list that a manager configured

How CANVAS has been used

- In conjunction with a spatial sample to characterize a whole city



- At specific intersections for location-based pedestrian injury research

Location Characteristic	Estimated Elevation in Pedestrian Injury Risk
Billboards	51%
Poor Pavement	4%
Traffic Calming	-32%

Benefits of CANVAS

- Vs. visiting in person:
 - Quicker and lower cost
 - Simpler planning logistics (e.g. no transportation required)
 - Ability to compare between cities (or countries)
- Vs. Street View without CANVAS
 - Automatic spatial sampling
 - Training w/real-time kappa scores
 - Monitoring (progress reports, time analyses)
 - Built-in mapping and quality control tools

Current Challenges

- Some offline GIS work needed to identify segments or intersections to audit
 - Future: Integrating more GIS tools into the system
- System not fully turn-key yet
 - We're comfortable doing some hand-holding now
 - Future: improved user interface