

# CycleGuard App + Findings from Bicycle Crash Reports

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IPRCE Quarterly Stakeholder Meeting

Thank you!

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**Research:** Safety for vulnerable  
travelers

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# Roadway Safety in the U.S.

- US:

- 30,000 - 40,000 **roadway deaths** per year (on average)<sup>1</sup>
- In 2017, 843 bicyclist deaths<sup>1</sup> (1% of trips made by bike)<sup>2</sup>

- Georgia<sup>3</sup>:

- (2005-2015): 5,834 *reported* bicycle crashes → 77% injury or fatality

1. [Insurance Institute for Highway Safety](#)
2. National Household Travel survey
3. GDOT GEARS Database

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- In 2017, **843 bicyclist deaths**<sup>1</sup> (1% of trips made by bike)<sup>2</sup>

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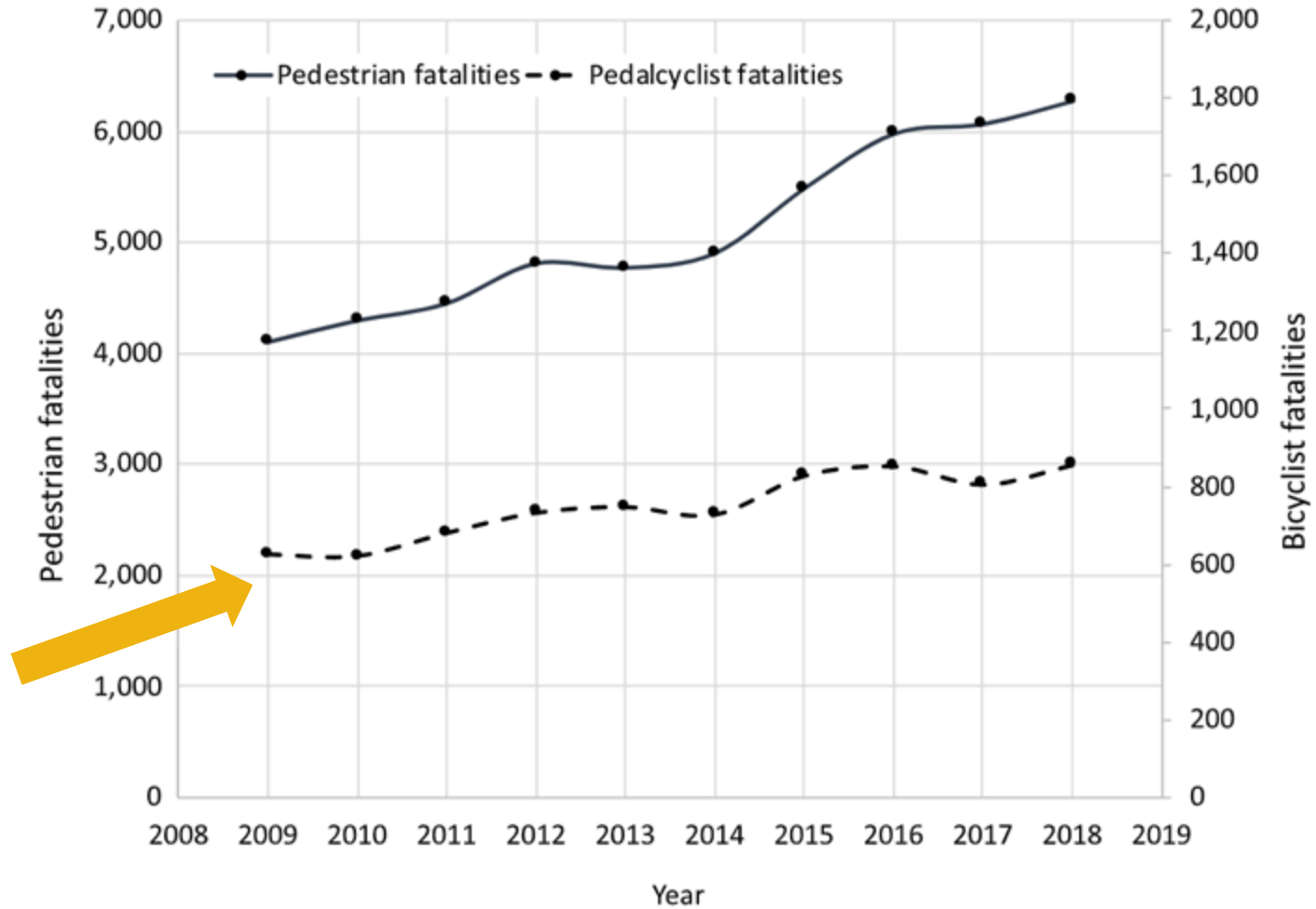
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# Fatality Trends



Pedestrian and bicyclist fatalities in the United States, 2009–2018 (NHTSA, 2019a, 2019b).

# CycleGuard

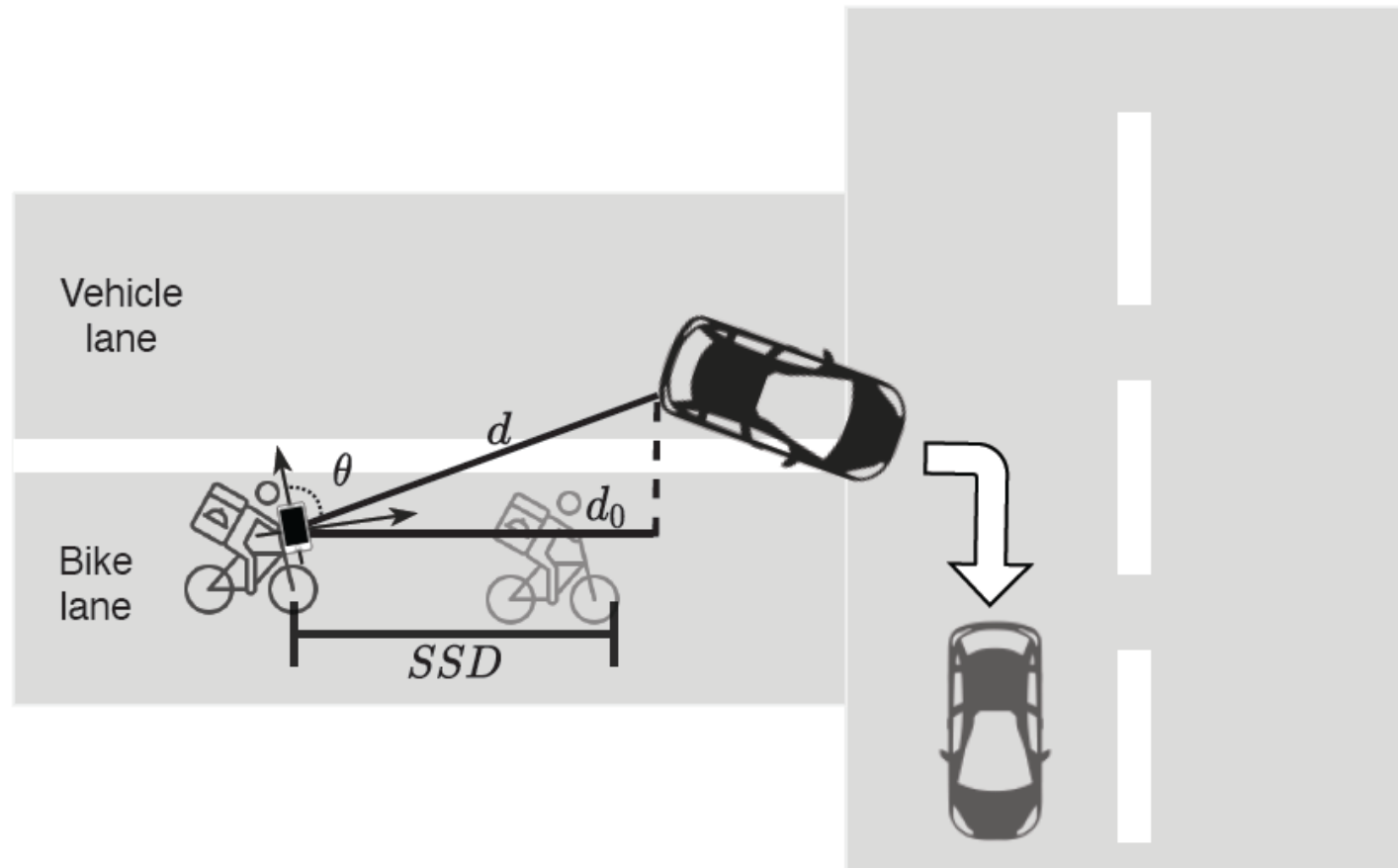
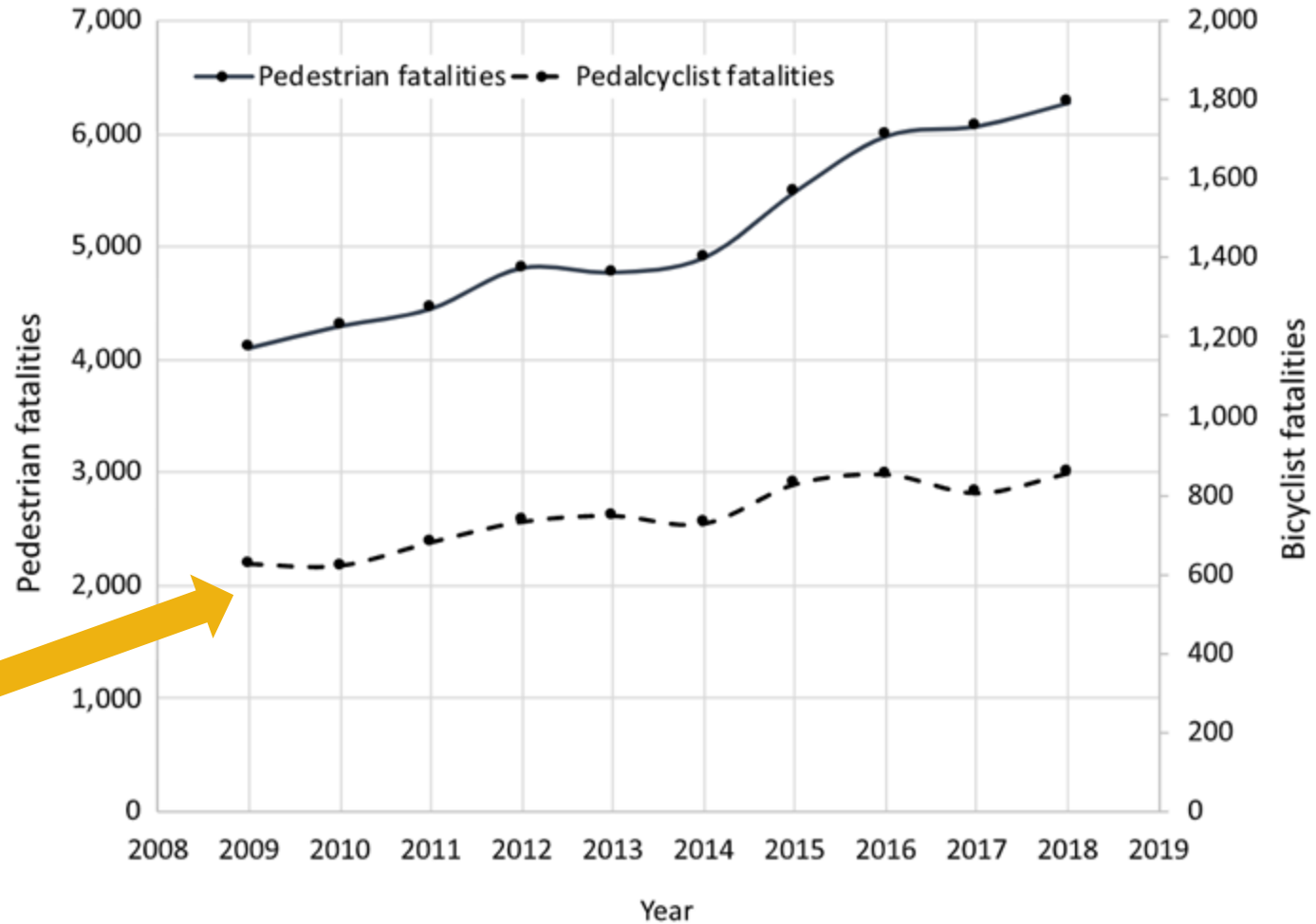
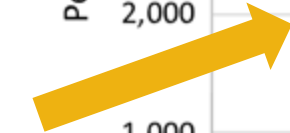


Fig. 1. Design rationale of CycleGuard.

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7% - 16% of crashes are “right-hooks” (depending on source)



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# CycleGuard

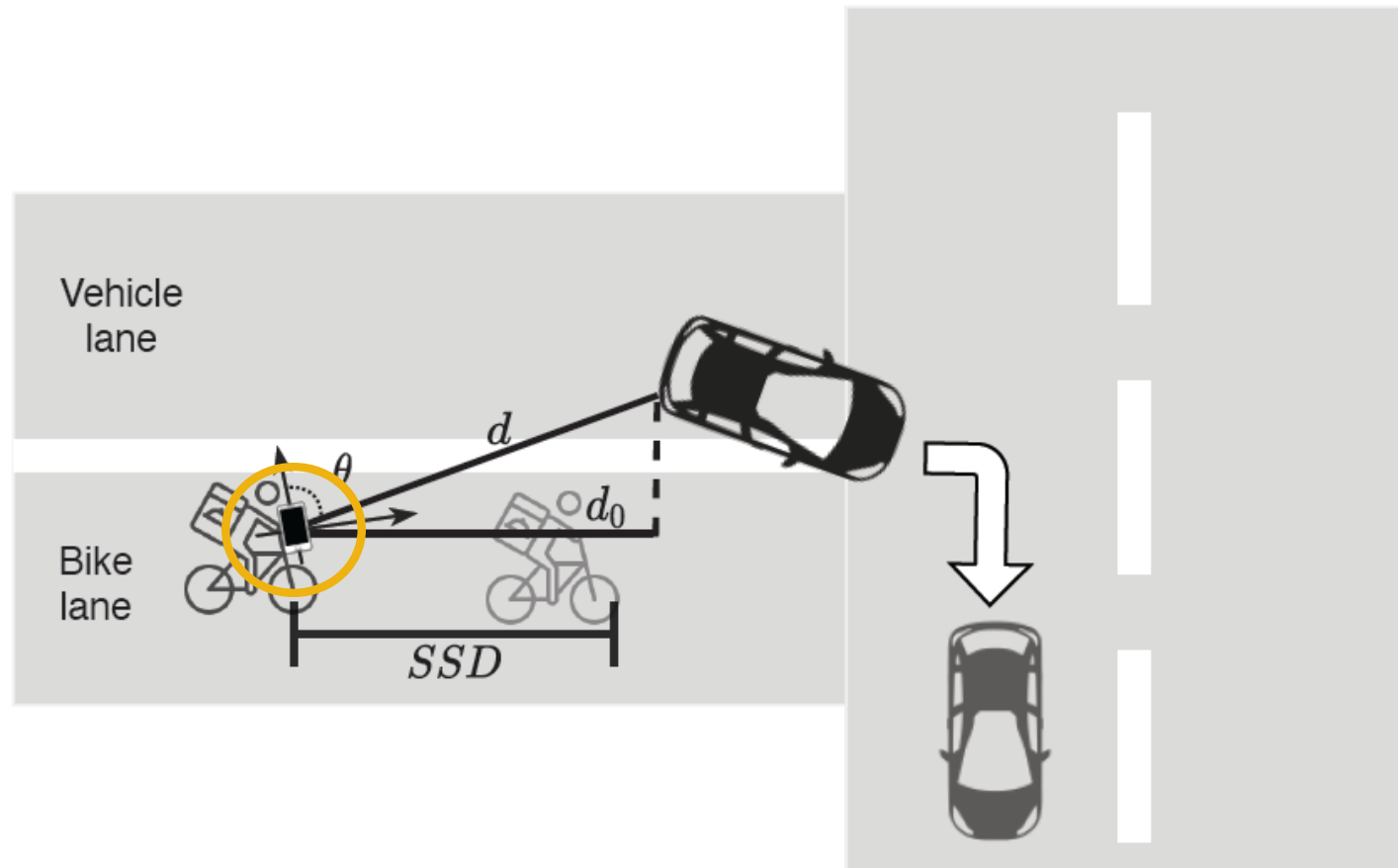
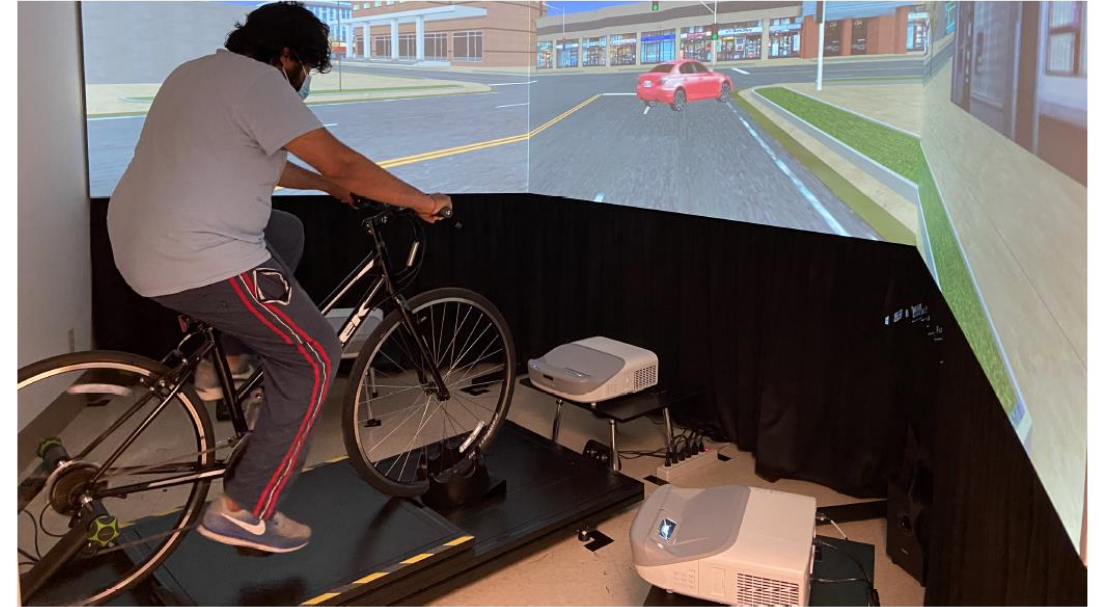


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# CycleGuard Testing



(a)



(b)

Fig. 17. Simulator setup. (a) Adopted scenario in the simulation. (b) Bike simulator.

# A key question: Which crashes?

- What kinds of crashes can CycleGuard help prevent?
- What kinds of scenarios should we test?
- Crash data analysis
  - Two states
    - *NCDOT*: 11,633 crashes (2007-2019)
    - *GDOT*: 4450 crashes (2015-2020)
  - Focus
    - *Crash context*
    - *Crash type*

# Crash Analysis Findings

- **Crash Context**
  - **Fatal crashes:** Nearly 40% of GDOT crashes and 37% of NCDOT crashes occurred in **darkness**
  - **Configuration:** 3% of all crashes occur on **one-way streets**, even when they make up smaller shares of the network (0.3% in GA); 30% of crashes occur on **4-lane roads**, despite 0.3% share of network.
  - **Speed:** Disproportionate share of crashes occur at posted speed limits 35-45 mph.
- **Crash Type**
  - **Failed over-taking**
  - **Angle-crashes**

# Problems with Crash Data

- Inconsistencies in variables reported between states
  - Weather vs. pavement conditions
  - Description of crashes
  - Bias in report narratives
- Systematic under-reporting of crashes with no injury
  - Crash data alone limits our understanding of the most preventable crashes re: CycleGuard

# Progress + Next Steps

- **Now:**

- Testing basic app functionality
- Designing user interface

- **Next Steps:**

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- [Limited] naturalistic tests

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- [Limited] naturalistic tests
- *Bicycle Crash reporting research*
  - Comparison of several states' crash data

# Thank you!

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