



Data Analytics at GWU

**THE GEORGE
WASHINGTON
UNIVERSITY**

WASHINGTON, DC

 John Paul Helveston, Ph.D.

 Eng. Management & Systems Eng.

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Hello World!



John Helveston, Ph.D.

Assistant Professor, Engineering Management & Systems Engineering

- 2016-2018 Postdoc at [Institute for Sustainable Energy](#), Boston University
- 2016 PhD in Engineering & Public Policy at Carnegie Mellon University
- 2015 MS in Engineering & Public Policy at Carnegie Mellon University
- 2010 BS in Engineering Science & Mechanics at Virginia Tech
- Website: www.jhelvy.com

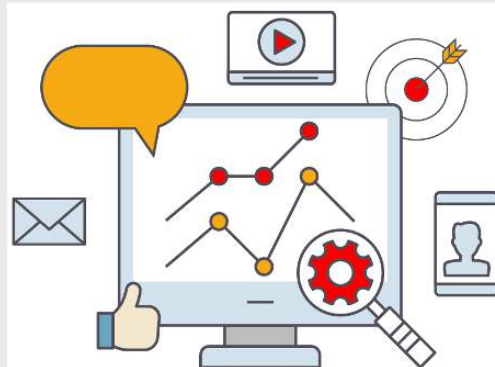
Technology Change Lab

I study how consumers, firms, markets, and policy affect technological change, with a focus on accelerating the transition to low-carbon technologies

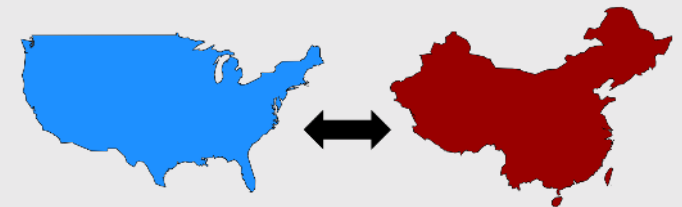
Electric & Sustainable Vehicle Technologies



Market & Policy Analysis



U.S. - China Climate Relationship



What is Data Analytics?

The science of analyzing raw data to draw out **meaningful & actionable insights** to **inform decision-making**

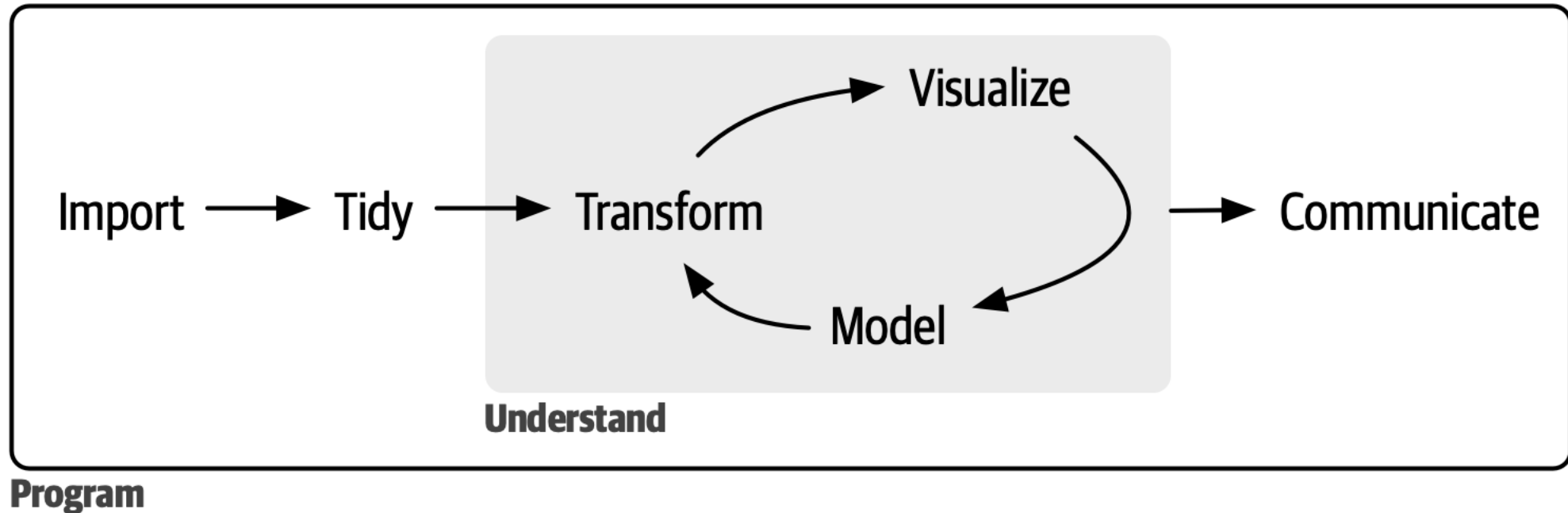






Image from <https://r4ds.hadley.nz/>

Data analytics in my lab

Choice Experiments

Bus	Rail	Ride-hailing	Shared Ride-hailing
Automated, Attendant Present	Not Automated	Automated, No Attendant Present	Automated, Attendant Present
			
Price: \$1 Total Trip Time: 20	Price: \$3 Total Trip Time: 30	Price: \$15 Travel Time: 30	Price: \$10 Total Trip Time: 35

Historical Data



How do you know what people want?



Which feature do you care more about?



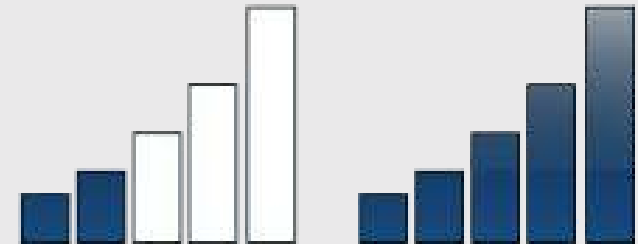
Battery Life?



Brand?



Signal quality?



Conjoint Analysis:

Use choice data to model preferences

<u>Attribute</u>	<u>Phone 1</u>	<u>Phone 2</u>	<u>Phone 3</u>
Price	\$400	\$450	\$350
Brand			
Battery Life			
Signal Quality			





Undercutting Transit?

Exploring potential competition between autonomous vehicles and public transportation in the U.S.

John P. Helveston, Assistant Professor, EMSE

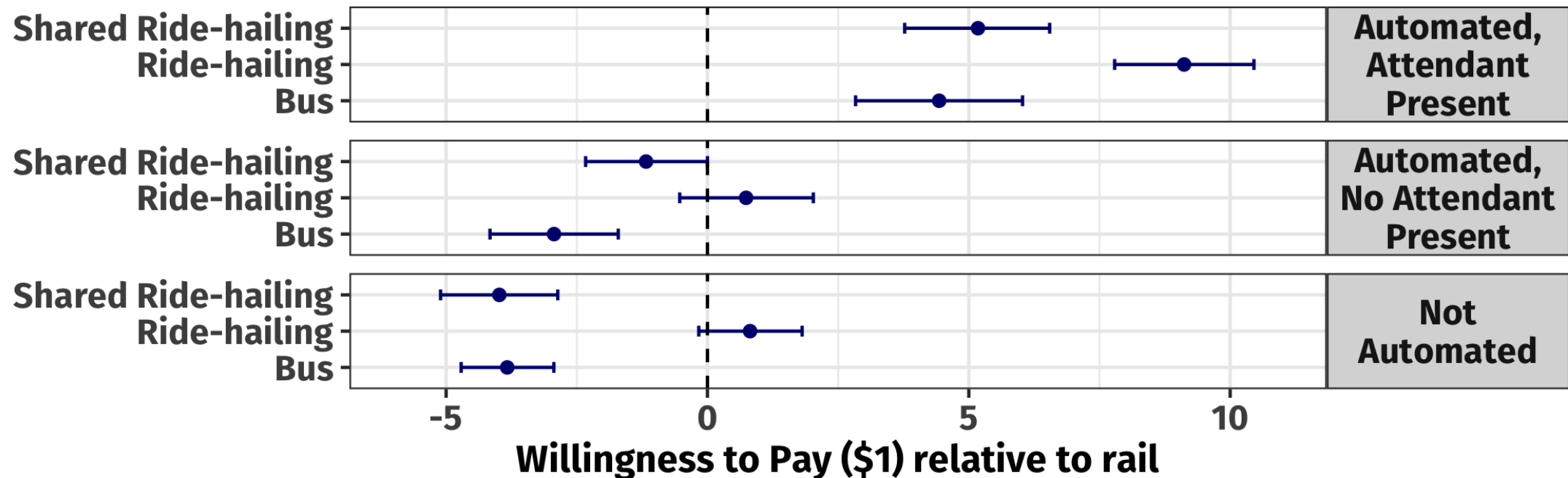
Leah Kaplan, Ph.D. Student, EMSE

Imagine you are going out for an evening leisure activity -
Which transportation option would you choose?

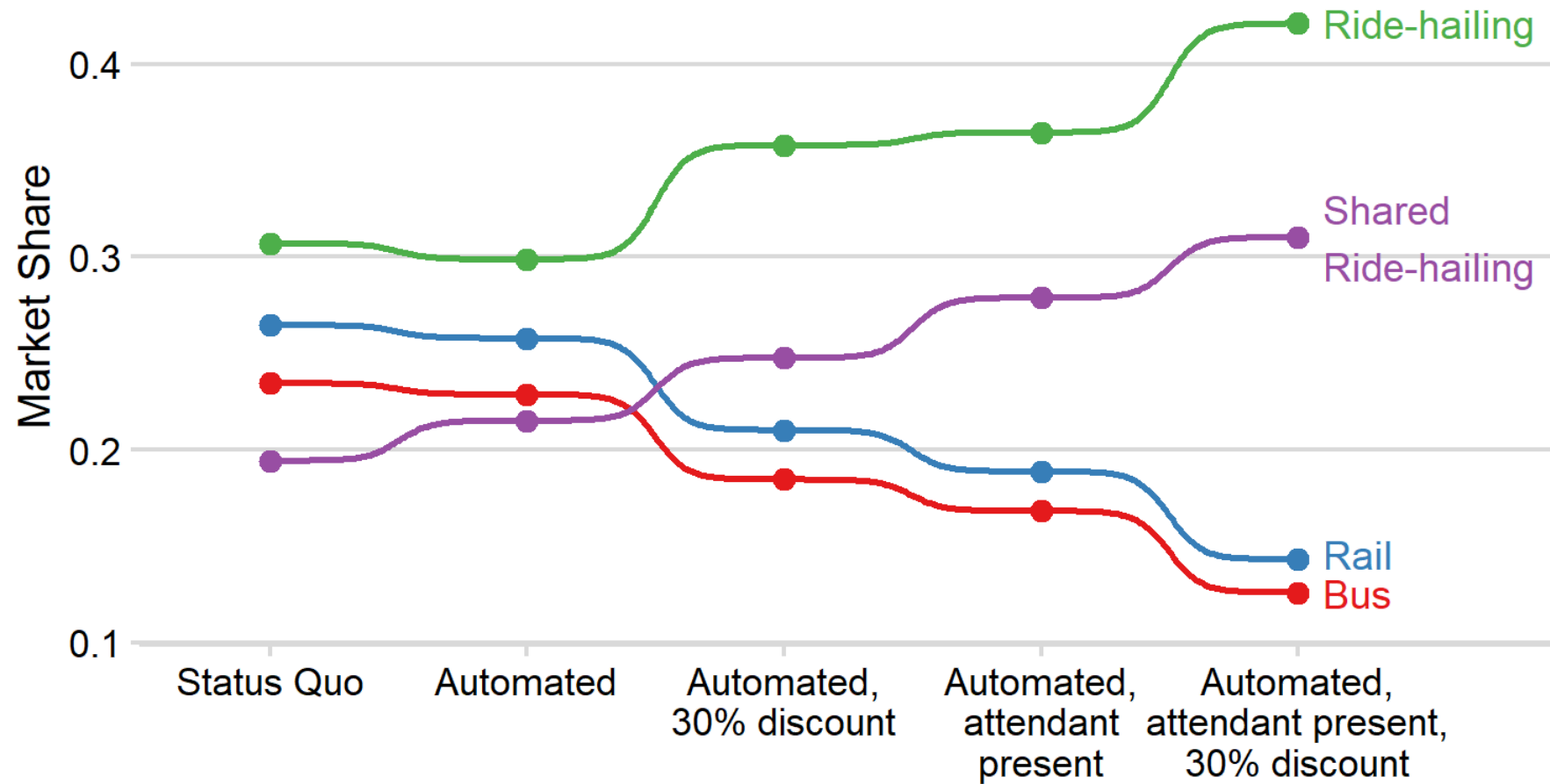
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AV preferences shift with addition of an attendant

Automation alone does not drastically alter mode preferences



Bad Transit Options Scenario



Analyzing historical vehicle listings data



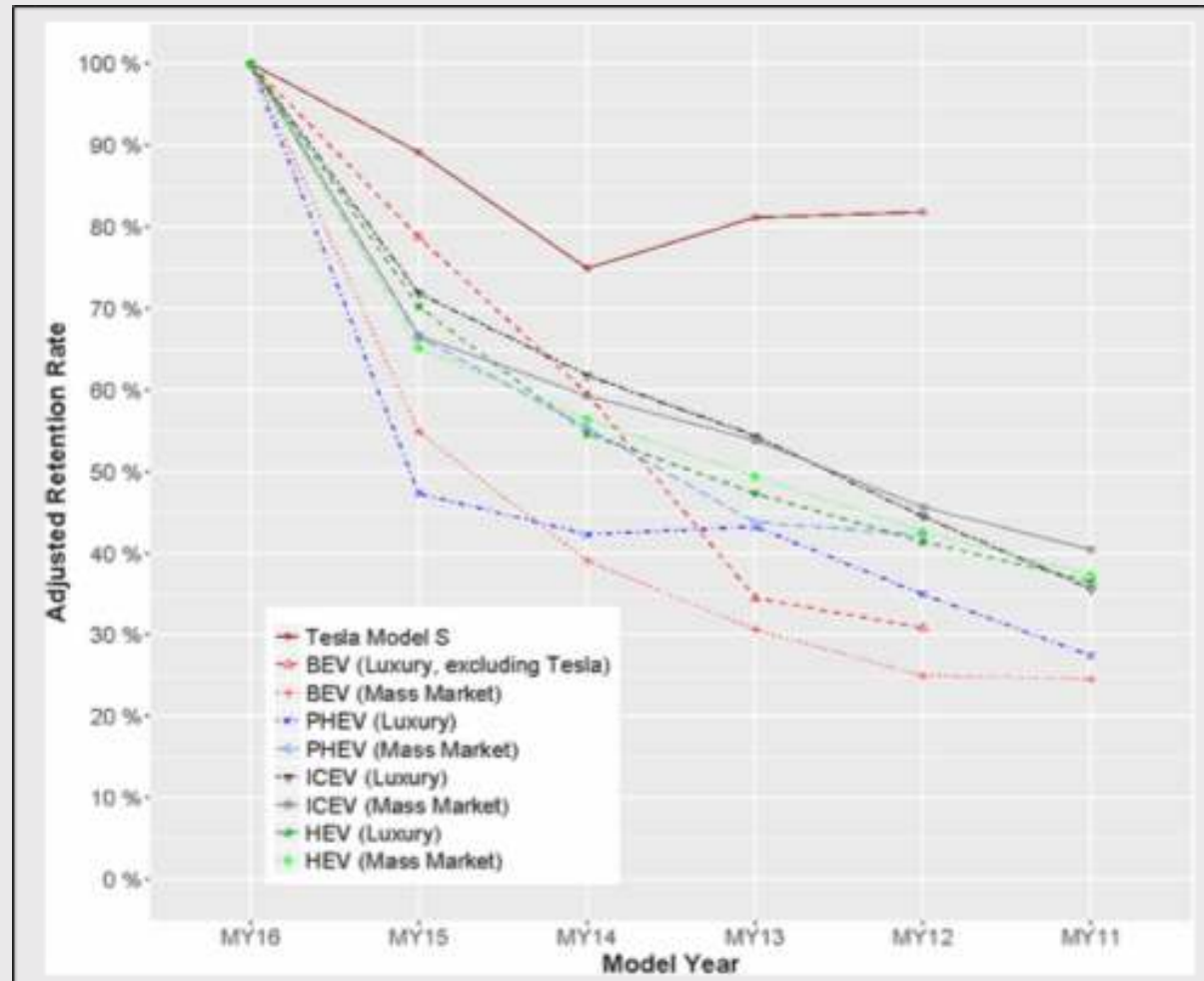
- New and used cars from 2016-2022
- ~66,000 dealerships

Powertrain	Listings
Gasoline	64,573,536
Hybrid	1,115,208
Battery Electric (BEV)	301,713
Plug-In Hybrid (PHEV)	198,129

Estimating residual value of EVs

John P. Helveston,
Assistant Professor,
EMSE

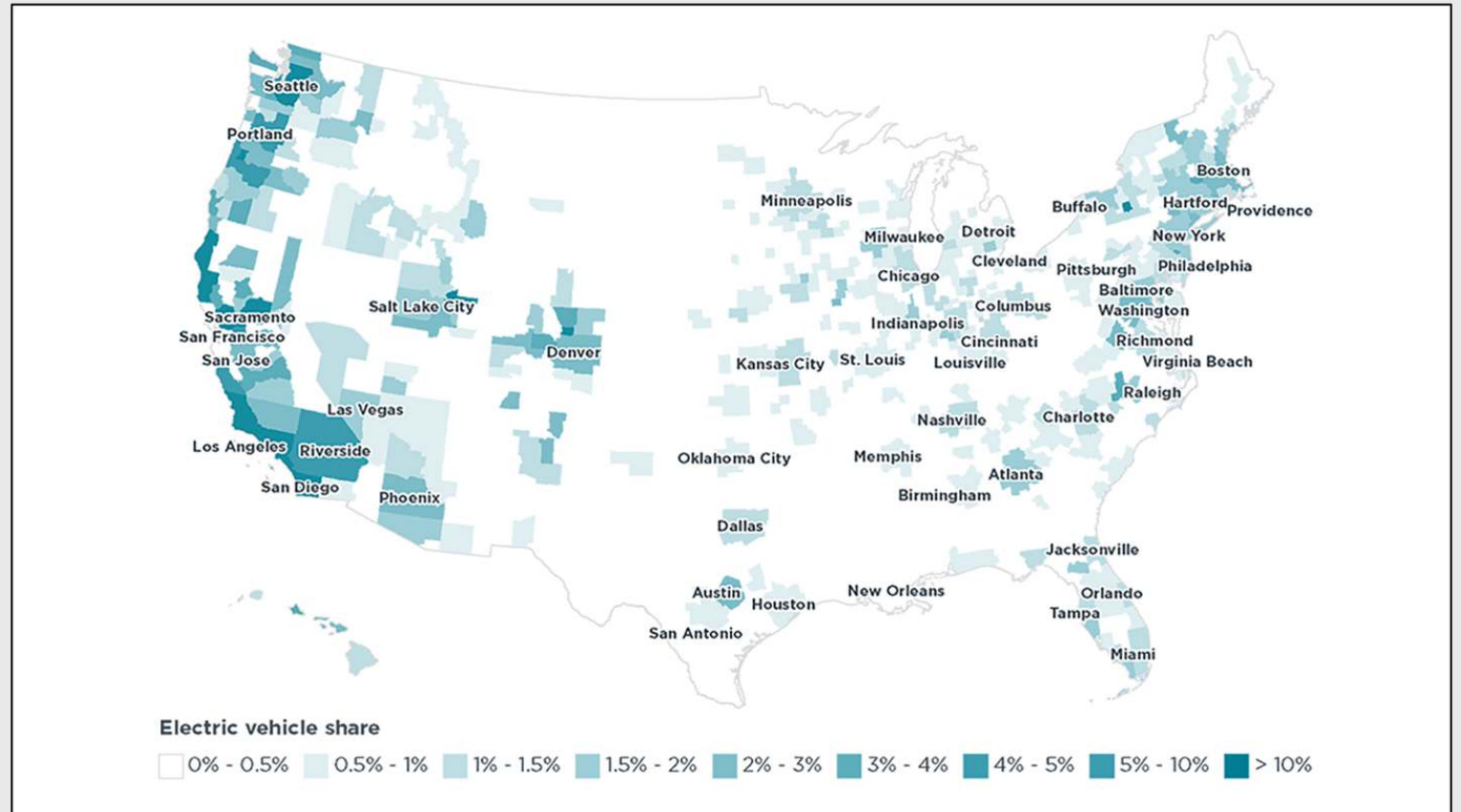
Laura Roberson, Ph.D.
Student, EMSE



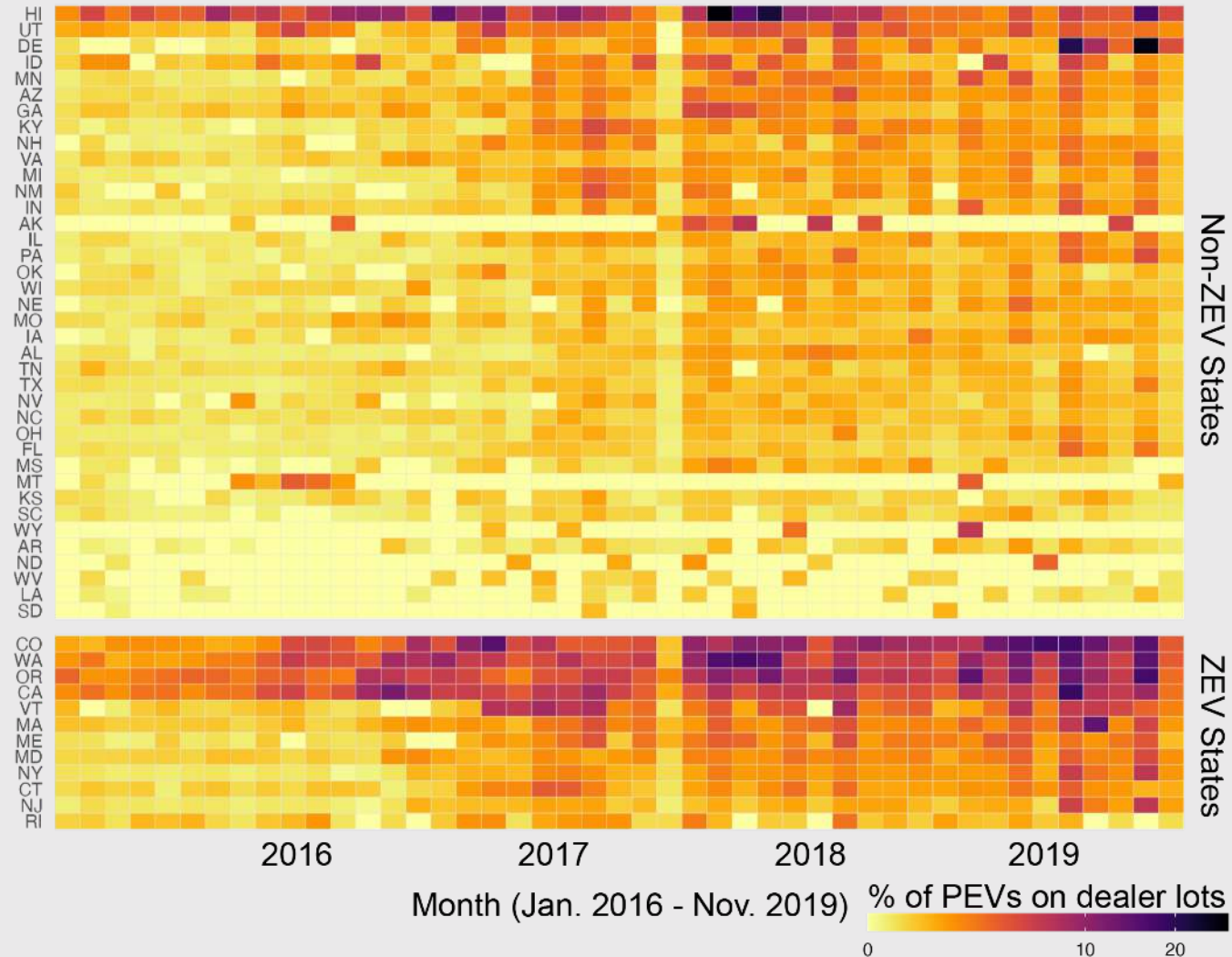
Where are the EVs?

John P. Helveston,
Assistant Professor,
EMSE

Kazi Asifa,
Undergraduate Student,
EMSE



EVs are disproportionately supplied to ZEV states

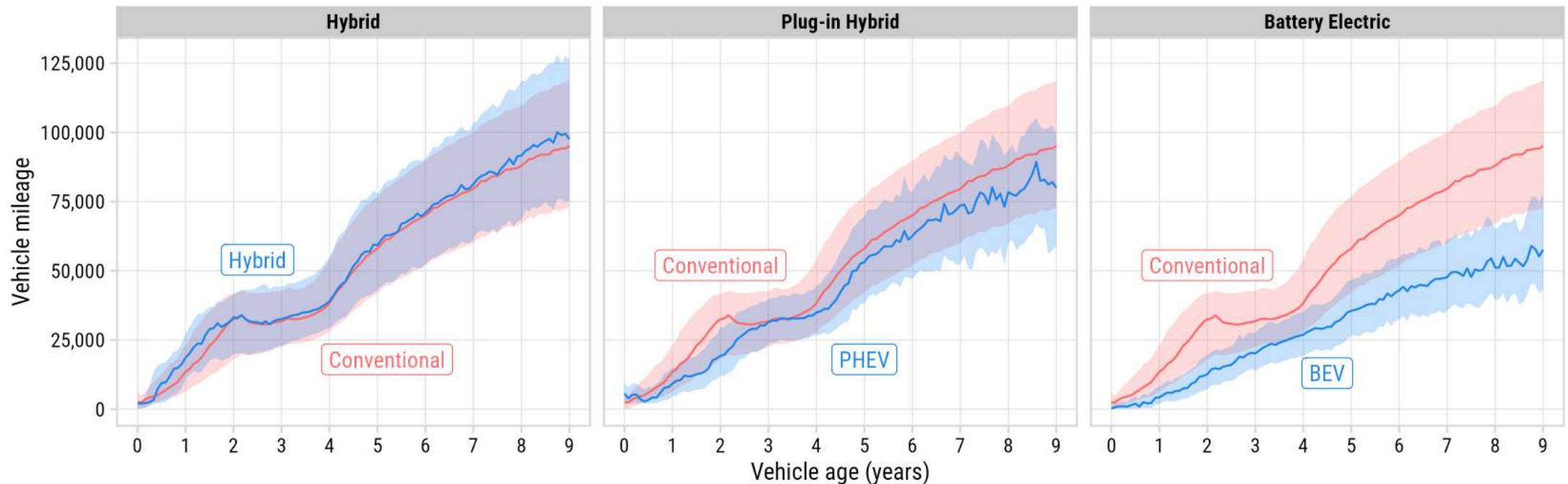


Do EV owners drive as much as gasoline car owners?

John P. Helveston, Assistant Professor, EMSE

Lujin Zhao, Ph.D. Student, EMSE

Eliese Ottinger, Undergraduate Student, EMSE



Thanks!

MS in Data Analytics Program:

<https://emse.engineering.gwu.edu/ms-data-analytics>

Dr. Helveston's Lab:

<https://jhelvy.com/>

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