# Connor Forsythe, Ph.D.

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*Demand analyst and data scientist with 5+ years of experience. 1+ years of experience in teaching. Expert in discrete-choice modeling, causal inference, and optimization. Skilled in integrating economic theories with machine learning. Committed to data-driven insights and innovations in interdisciplinary development.*

## KEY SKILLS

**Research:** Causal Inference, Econometrics, Consumer Behavior, Optimization, Machine Learning
**Technical:** Python, R, Stata, MATLAB, Julia, SQL, LaTeX, keras, sklearn, NumPy, Pandas
**Data Collection:** Survey Design and Deployment, Data Cleaning
**Project Management:** Project Coordination, Stakeholder Engagement, Interdisciplinary Communication

## EDUCATION

**Carnegie Mellon University, Pittsburgh, PA** August 2018-August 2023
Ph.D. in Mechanical Engineering, QPA: 3.80/4.0
**Thesis**: Econometric Estimation of Consumer Responses to Personal Transportation Policies and Technologies

**The George Washington University, Washington, DC** August 2014-May 2018
B.S. in Systems Engineering, GPA: 3.97/4.0
**Minors**: Statistics and Computer Science
**Honors:** Graduated Summa Cum Laude, Top of Class

## PROFESSIONAL EXPERIENCE

**Postdoctoral Researcher** August 2023–Present
*Engineering and Public Policy; Carnegie Mellon University, Pittsburgh, PA*
**Project Management:** Proposing, designing, and executing research projects with fellow researchers.
**Interdisciplinary Collaboration:** Promoting interdisciplinary research across economics, business, and engineering.
**Research Communication:** Authoring ten research articles, preparing proposals, and presenting at conferences.
**Mentoring:** Advising four students in econometrics, coding, optimization, research design, and communication.

### Teaching Experience

**Carnegie Mellon University:**
*Graduate Teaching Assistant for Engineering Optimization* Spring 2020-Fall 2020
- Lectured on nonlinear programming topics and relevant implementation methodologies.
- Held office hours, helped in the construction as well as preparation of assignments and teaching materials.

**The George Washington University:**
*Undergraduate Teaching Assistant for Systems Thinking and Policy Making* Fall 2017
- Participated in a teaching team that taught students the fundamentals of systems thinking as well as methods and software necessary to implement system dynamics models.

*Undergraduate Teaching Fellow for Introduction to Systems Engineering* Fall 2015
- Participated in a teaching team that taught students the core concepts of systems engineering, computer science, and robotics.

## RESEARCH PROJECTS AND EXPERIENCE

**Identify changes in technology demand – Electric Vehicles (EVs)**
**Method:** Estimated and compared discrete-choice models of mainstream EV demand over time.
**Finding:** Several modern and future EVs are or will be competitive with their gasoline counterparts.
**Takeaway:** Technology has influenced EV demand more so than changes in consumer preferences.

**Model demand for emerging technologies – Electric Pickup Trucks**
**Method:** Designed experiments and estimated discrete-choice models of electric pickup demand.
**Finding:** 78% of pickup buyers are open to EV adoption, while 22% remain opposed.
**Takeaway:** Findings suggest that there is large market potential for EV pickup trucks.

**Develop novel models of consumer demand with machine learning**
**Method:** Developed a novel model of consumer demand integrating economic theories with machine learning.

**Finding:** Outperformed state-of-the-art artificial neural networks.
**Takeaway:** Model can improve future policy analyses and product design.

**Model the causal link between vehicle registration and usage**
**Method:** Used state safety inspections to causally identify vehicle registration's impact on utilization.
**Finding:** Demonstrated vehicle use did not increase 1:1 with registrations.
**Takeaway:** Findings could reduce estimated statewide vehicle safety inspection policy costs by $90M annually.

**Model demand for emerging technologies – Autonomous grocery delivery**
**Method:** Designed experiments and estimated discrete-choice models for autonomous grocery delivery demand.
**Finding:** Cost benefits of autonomous vehicles may yield higher adoption of grocery delivery services.
**Takeaway:** Grocery delivery companies should consider autonomous vehicle deployment.

**Assess causal effect of transportation network company (TNC) tax policy**
**Method:** Constructed spatially-dependent model relating Chicago TNC tax change to TNC rides.
**Finding:** Chicago TNC tax hikes led to fewer TNC rides on the road.
**Takeaway:** Cities seeking to reduce TNC congestion should consider increasing taxes on TNC rides.

**Optimization of vehicle parking demand allocation**
**Method:** Constructed model of city parking system as mixed-integer linear program.
**Finding:** Parking demand allocation efficiency is sensitive to number of spots, demand levels, arrival flexibility.
**Takeaway:** Parking reservation systems should be used in judiciously in small banks of parking spots.

**Systematically review academic automotive demand models**
**Method:** Identified and classified automotive demand models in academic literature.
**Finding:** Random utility models (RUMs) are used in the majority of automotive demand models.
**Takeaway:** Certain RUM formulations that balance flexibility and computational burden may be underutilized.

## REFERENCES

Jeremy J. Michalek, Ph.D.
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Kate S. Whitefoot, Ph.D.
Associate Professor of Mechanical Engineering,
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