

Siddharth Prusty

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Education

Ph.D.	Duke University , Durham, NC Marketing (Quantitative)	Expected 2026
M.S.	Columbia University , New York City, NY Industrial Engineering and Operations Research	2020
B.Tech.	Indian Institute of Technology , Kanpur, India Electrical Engineering	2016

Research Interests

Substantive: Policy Design, Retail Media, Advertising Auctions, Sustainability, Regulation.

Methodological: Structural Econometrics, Analytical Modeling, Machine Learning, Operations.

Publications and Working Papers

*(Abstracts in Appendix) (*Authors Listed Alphabetically)*

Siddharth Prusty, Carl F. Mela, and Hana Choi. “**Enhancing Position Auctions in Retail Media.**” Working Paper (*Job market paper*), 2025.

Wilfred Amaldoss* and Siddharth Prusty*. “**Sustainable Consumption: A Strategic Analysis.**” Forthcoming in *Marketing Science*, 2025.

Fengpei Li, Henry Lam, and Siddharth Prusty. “**Robust Importance Weighting for Covariate Shift.**” *Proceedings of the Twenty Third International Conference on Artificial Intelligence and Statistics*, PMLR 108:352-362, 2020.

Selected Work in Progress

Wilfred Amaldoss* and Siddharth Prusty*. “**Regulating Sustainable Products: A Public Policy Perspective.**”

Conference Presentations

“Enhancing Position Auctions in Retail Media”

- ISMS Marketing Science Conference, University of Georgia (Washington, D.C.), 2025

“Sustainable Consumption: A Strategic Analysis”

- 18th Annual Bass Forms Conference, U.T. Dallas, 2024

- Marketing for Environmental Sustainability Conference, Stanford University, 2023
- ISMS Marketing Science Conference, University of Chicago Booth (Virtual), 2022

Awards, Honors, Service

AMA Sheth Doctoral Consortium (Duke Nominee), Ohio State University, 2025

Ad-Hoc Reviewer, Management Science, 2023

ISMS Doctoral Consortium Fellow (Duke Nominee), U. Chicago Booth (Virtual), 2022

Shardashish Interschool Fellowship, Columbia University, 2018

Honda Young Engineer and Scientist Award, Honda Foundation, 2014

Academic Excellence Award, Indian Institute of Technology, Kanpur, 2013

Teaching

Instructor, Statistical Programming Bootcamp	Duke University
<ul style="list-style-type: none"> • Developed and instructed week-long course on Python (for incoming Ph.D. students in Business Administration) 	2023

Teaching Assistant	Duke University
<ul style="list-style-type: none"> • Value Creation in Martech (MBA, MQM), taught by Carl Mela • Strategy and Tactics of Pricing (MBA, EMBA, MQM), taught by Wilfred Amaldoss • Marketing Management (WEMBA), taught by Preyas Desai • Programming Analytics (MQM), taught by Allison Chaney • Strategic Brand Management (MBA, EMBA), taught by Tong Guo • Marketing Core (MMS), taught by Srinivas Tunuguntla 	2021/23/24 2025 2025 2023 2022/23 2022

Teaching Assistant	Columbia University
<ul style="list-style-type: none"> • Stochastic Models and Applications, taught by Ton Dieker • Introduction to Financial Engineering, taught by David Yao 	2020 2019/20

Graduate Coursework

Marketing & Business Administration

PhD level:

Quantitative Marketing Proseminar	Rick Staelin
Special Topics in Quantitative Marketing	Carl F. Mela
Structural Modeling in Marketing (<i>at UNC-CH</i>)	Sriram Venkataraman
Economic Models in Marketing (<i>at UNC-CH</i>)	Rajdeep Grewal
Special Topics in Quantitative Marketing	Allison Chaney, Tong Guo

Economics

PhD level:

Microeconomics I	Philipp Sadowski, Curtis Taylor
Econometrics I	Matt Masten
Industrial Organization	Allan Collard-Wexler, Daniel Xu

Partial Identification: Theory and Applications in IO
Theoretical Industrial Organization (*at UNC-CH*)
Dynamic Discrete Choice
Causal Inference and Treatment Effects

Allan Collard-Wexler, Adam Rosen
Gary Biglaiser
Peter Arcidiacono
Arnaud Maurel

Operations Research

PhD level:

Stochastic Modeling I
Stochastic Modeling II
Optimization I (Continuous Optimization)
Optimization II (Discrete Optimization)
Statistical Models for Simulations

Karl Sigman
Ton Dieker
Vineet Goyal
Yuri Faenza
Henry Lam

Statistics and Machine Learning

Master's level:

Introduction to Machine Learning
Optimization Methods in Machine Learning
Bayesian Models in Machine Learning
Time Series Analysis
Statistical Techniques in Data Mining

Cynthia Rudin
Satyen Kale
John Paisley
Amit Mitra
Amit Mitra

Professional Experience

IBM Research Labs , Research Intern, Armonk, NY	Summer 2020
American Express , Risk Data Analyst, Gurugram, India	2016-2018
iRageCapital Advisory Pvt. Ltd. , Quant Trading Intern, Mumbai, India	Summer 2015
Ecole Normale Supérieure , Software Research Intern, Paris, France	Summer 2014
Avanti Fellows , Course Content Development Intern, Delhi, India	Summer 2013

Computer Languages and Skills

Programming languages: Python, R, Mathematica, Matlab

Tools: LaTeX (Overleaf, Beamer, LyX), Microsoft (Word, PowerPoint, Excel)

References

Carl F. Mela

(Dissertation Chair)

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Appendix: Abstracts

Siddharth Prusty, Carl F. Mela, and Hana Choi. **“Enhancing Position Auctions in Retail Media.”** Working Paper (*Job market paper*), 2025.

Retail media is a fast-growing channel for digital advertising, surpassing \$50 billion of ad spend in 2023. Much of retail media ad spend is monetized by position auctions, wherein advertisers bid for higher placements on retailer's product listing page. Winning such auctions is influenced not only by advertiser bids, but also by a retailer-set quality score. Quality scores are used to favor advertisers who, for example, garner more clicks and purchases, since the retailer seeks to monetize both consumer actions.

Building on the intuition that a retailer can monetize both clicks (through auction payments) and purchases (through commissions), this paper proposes simple-to-implement quality score mechanisms that improve a retailer's profit and advertiser surplus in position auctions. To predict the long-term implications of the proposed quality score rules, we develop a structural model predicting how bids vary with quality scores and use machine learning to predict clicks and purchases. Using granular auction-advertiser level data obtained from a retail website, we show that proposed quality score enhancements can improve retailer's profits and advertiser surplus over status-quo rules. Since the proposed quality scoring mechanisms lead to mutually beneficial outcomes, they have the potential to substantially enhance efficiency and revenue outcomes in retail media position auctions.

Wilfred Amaldoss and Siddharth Prusty. **“Sustainable Consumption: A Strategic Analysis.”** Forthcoming in *Marketing Science*, 2025.

Consumers' growing concern for the environment has motivated firms to offer sustainable products in several categories. An exploratory survey shows that many consumers desire sustainable products and are willing to pay more for them, but some consumers dislike sustainable products and want to pay less for them. Using a theoretical model where firms are horizontally differentiated and two groups of consumers have divergent preference for sustainable products, we investigate the strategic implications of sustainable consumption. First, our analysis shows that when consumers' dislike for sustainable products is moderate, the price could increase as the dislike increases. Moreover, price could decrease if consumers' desire for sustainable products increases. Second, we find that competing firms' profits can decrease with consumers' desire for sustainability but increase with consumers' dislike for sustainability. Third, we clarify when and why enforcing minimal sustainability standards for products can backfire and reduce consumer surplus. Finally, we extend the model to capture additional facets of sustainable consumption, such as multi-product firms, sustainable luxury goods and political orientation of consumers, and tease out its counterintuitive implications for the firms supplying sustainable products.

Wilfred Amaldoss and Siddharth Prusty. **“Regulating Sustainable Products: A Public Policy Perspective.”**

This paper considers consumption externalities and behavioral biases influencing sustainable consumption and investigates how they could inform the design of regulatory instruments. At the core of sustainable consumption lies a public goods dilemma: while some consumers invest significant financial and personal resources in adopting sustainable practices, and some firms incur costs to develop eco-friendly products and services, a considerable proportion of both consumers and firms engage in free riding, reaping the environmental benefits of sustainability without contributing to its provision (Milinski et al., 2006). Moreover, sustainable consumer behavior frequently exhibits present bias, wherein short-term consumption benefits are weighted more heavily than the long-term environmental and social consequences of those choices (Trudel, 2019). Using a theoretical model incorporating said consumer preferences for sustainability, this paper investigates the strategic implications of regulatory instruments targeted towards consumers (e.g., price discounts) or firms (e.g., sustainability mandates). The theoretical analysis, currently in preliminary stages, examines how policymakers can design regulatory instruments to incentivize both firms and consumers to foster a sustainable future.

Fengpei Li, Henry Lam, and Siddharth Prusty. “**Robust Importance Weighting for Covariate Shift.**” *Proceedings of the Twenty Third International Conference on Artificial Intelligence and Statistics*, PMLR 108:352-362, 2020.

In many learning problems, the training and testing data follow different distributions and a particularly common situation is the covariate shift. To correct for sampling biases, most approaches, including the popular kernel mean matching (KMM), focus on estimating the importance weights between the two distributions. Reweighting-based methods, however, are exposed to high variance when the distributional discrepancy is large, and the weights are poorly estimated. On the other hand, the alternate approach of using nonparametric regression (NR) incurs high bias when the training size is limited. In this paper, we propose and analyze a new estimator that systematically integrates the residuals of NR with KMM reweighting, based on a control-variate perspective. The proposed estimator can be shown to either strictly outperform or match the best-known existing rates for both KMM and NR and thus is a robust combination of both estimators. The experiments show the estimator works well in practice.