Poet Ossian Larsen

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EDUCATION

UNIVERSITY OF SOUTHERN CALIFORNIA *Los Angeles, CA*
Doctor of Philosophy in Management- Marketing *August 2020 - (expected) May 2025*
Advisor: Davide Proserpio

UNIVERSITY OF WISCONSIN, MADISON *Madison, WI*
Bachelor of Business Administration *August 2016 - May 2020*
Majors: Statistics; Information Systems **Minors**: Computer Science; Mathematics

RESEARCH INTERESTS

My current research interests are focused on empirically studying the economic impact AI has on firm competition in the digital advertising ecosystem.

ACADEMIC RESEARCH

1. Larsen, P & Proserpio, D (Working Paper). Market Expansion or Segmentation: How Better NLP Algorithms Impact Sponsored Search Auctions.
   Identifying all relevant search queries to target with advertisements is a difficult problem for firms when using the sponsored search advertising channel. To alleviate this issue, search engines offer *broad match*. With *broad match*, an advertiser gives a search engine the flexibility to target and bid for additional queries the search engine thinks are "relevant" to the given advertiser. Search engine *broad match* services commonly rely on Natural Language Processing (NLP) models to help interpret search queries and subsequently match advertisers to query auctions (what we call query interpretation systems). At times, search engines update these algorithms, surely altering the auction markets for sponsored search advertising. While some marketing research has theorized how such change to *broad match* services might impact sponsored search auctions, there is a lack of empirical research studying this problem, leaving practitioners and academics wondering what these algorithm changes mean for advertising campaigns and auction market competition. In this project, we ask the following question: how does improving the quality of query interpretation systems impact the number of bidders and cost-per-click (CPC) for sponsored search auctions? We study this question by empirically analyzing sponsored search auction market changes following Google's October 26th, 2019 roll-out of BERT to Search.

2. Larsen, P & Proserpio, D (Working Paper). Behavior of Competing Reinforcement Learning Algorithms in Display Advertising: Evidence from the Field.
   Drawing from the economics and marketing literature that suggests independent and competing reinforcement learning algorithms can learn collusive pricing strategies, we study the behavior of these algorithms in the context of targeted advertising. Specifically, we ask the following question: can independent and competing reinforcement learning algorithms used for budget allocation naturally differentiate and segment markets in digital advertising? We use a set of simulations and field experiments to empirically study this question. Our results have meaningful implications for both advertising practitioners and policymakers interested in understanding whether algorithms can help facilitate anti-competitive behavior.

3. Melessa, S, Larsen, P, Hoban, P (2022). The Roll of Digital Ad Clutter in Advertiser Conversions and Ad Viewership. (*Preparing for submission to Journal of Marketing Research*).
   Conflicting findings in extant literatures leave managers wondering if digital advertising clutter meaningfully impacts advertising response and how to advertise more effectively in cluttered digital spaces. In this work, researchers conduct an innovative series of eye-tracking studies to understand if, and how, digital clutter impacts digital ad observation, illustrating how viewership drops substantially (roughly 30%) in clutter's presence. The paper then examines whether digital ad clutter functions as a relevant predictor of viewer

conversions with advertisers in the real world by providing the first large-scale field study of digital ad clutter. The research provides generalizable findings using a large panel dataset detailing the interactions between nearly one-million consumers, 85 thousand publishers, and 19 advertisers over a two-month period. The authors find managerially substantive results, showing that a one standard deviation increase in clutter associates with as much as an 85% reduction in conversion probabilities on average across campaigns with considerable variation. The paper discusses implications for advertisers, publishers, and marketing researchers.

CONFERENCE PRESENTATIONS

Market Expansion or Segmentation: How Better NLP Algorithms Impact Sponsored Search Auctions

- Artificial Intelligence, Machine Learning, and Business Analytics (2022).

Behavior of Competing Reinforcement Learning Algorithms in Advertising: Evidence from the Field

- ZEW Conference on the Economics of Information and Communication Technologies (2022).
- ISMS Marketing Science Conference, online (2022).
- Artificial Intelligence, Machine Learning, and Business Analytics, online (2021).