

June 2018

# Hana Choi

Ph.D. Candidate, Quantitative Marketing  
Duke University

## CONTACT

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## EDUCATION

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PhD	<b>Duke University</b> , Quantitative Marketing	June 2019 (expected)
MA	<b>University of Pennsylvania</b> , Economics	2012
BS	<b>Yonsei University</b> , Dual in Business Administration and Economics	2007

## RESEARCH INTERESTS

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Digital Economy, Advertising, Consumer Search, Two-Sided Markets, Startup Business, Applied IO

## WORKING PAPERS

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- **Display Advertising Pricing in Exchange Markets**  
with Carl F. Mela  
*Job Market Paper*
- **Monetizing Online Marketplaces**  
with Carl Mela  
Revising for 2<sup>nd</sup> round at *Marketing Science* (at final proof-reading stage for submission)  
Previously titled “Online Marketplace Advertising”
- **Online Display Advertising Markets: A Literature Review and Future Directions**  
with Carl F. Mela, Santiago Balseiro, Adam Leary  
Revising for 2<sup>nd</sup> round at *Information Systems Research*

## WORK IN PROGRESS

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- **Display Advertising Pricing, Allocation, and Information Sharing in Dual Channel**  
with Carl F. Mela  
Data collected, analysis in progress

- **Long-Term Effect of SMS Retargeting: Balancing Opt-Out and Short-Term Direct Responses**  
Data collected, analysis in progress

## INDUSTRY EXPERIENCE

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- **CBS Interactive, Data Science Team**, San Francisco, CA  
Academic Research Fellow June 2015 - Present
- **The-Nuvo**, Seoul, Korea  
CMO Feb 2013 – Aug 2013  
Data Analyst (Part Time) Nov 2011 – Jan 2013
- **Ernst & Young, Transfer Pricing Division**, Manhattan, NY  
Intern Summer 2012

## HONORS AND AWARDS

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Dissertation Research Travel Award, Duke University, \$2000	2017
MSI Research Grant, co-PI with Carl Mela, Santiago Balseiro, Adam Leary, \$5000	2016
Graduate Fellowship, Duke University	2013
Korea Foundation for Advanced Studies (KFAS) Fellowship	2007
BK 21 Research Scholarship	2007
DK Korea Fellowship	2006
Higher Civil Service National Examination Scholarship	2005
Yonsei University Scholarships	2003

## PRESENTATIONS

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- **Monetizing Online Marketplaces**  
NBER Summer Institute IT and Digitization, Boston 2017  
Marketing Science Conference, Johns Hopkins 2015
- **Display Advertising Pricing in Exchange Markets**  
Duke-UNC Brownbag 2017  
CBS Interactive, San Francisco 2015, 2016

## CONFERENCE PARTICIPATION

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Marketing Science Conference, Temple	2018
ISMS Doctoral Consortium, Temple	2018
NBER Summer Institute, Boston	2017
Quantitative Marketing and Economics, Northwestern	2016
Quantitative Marketing and Economics, MIT	2015
Marketing Science Conference, Johns Hopkins	2015
Marketing Science Conference, Emory	2014
ISMS Doctoral Consortium, Emory	2014
Workshop on Quantitative Marketing and Structural Econometrics, Duke	2013

## TEACHING EXPERIENCE

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- **Duke University, Teaching Assistant**  
Strategy and Tactics of Pricing (MBA), taught by Wilfred Amaldoss 2017  
Marketing Core (MBA), taught by Carl Mela and Bryan Bollinger 2015, 2016  
Product Management (MBA), taught by Carl Mela 2014
- **University of Pennsylvania, Teaching Assistant**  
Microeconomic Foundations (MBA) 2012  
Advanced Topics in Managerial Economics (MBA) 2012  
Business Economics and Public Policy (undergraduate course) 2012  
Managerial Economics (undergraduate course) 2010, 2011
- **University of Pennsylvania, Instructor**  
Intermediate Microeconomics (undergraduate, summer course) 2010
- **Yonsei University, Teaching Assistant**  
Intermediate Microeconomics (undergraduate course) 2007

## CONTACTS FOR LETTERS

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**Carl F. Mela (Chair)**

T. Austin Finch Foundation Professor of Marketing  
Executive Director, Marketing Science Institute  
Duke University  
mela@duke.edu

**Bryan Bollinger**

Assistant Professor of Marketing  
Duke University  
bryan.bollinger@duke.edu

**Santiago R. Balseiro**

Assistant Professor of Decision, Risk, and Operations  
Columbia University  
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**Hema Yoganarasimhan**

Associate Professor of Marketing  
University of Washington  
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## SELECTED RESEARCH ABSTRACTS

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- **Display Advertising Pricing in Exchange Markets**

With Carl F. Mela

**Abstract:** This paper considers how a publisher (e.g., Wall Street Journal) should set reserve prices for real-time bidding (RTB) auctions when selling display advertising impressions through ad exchanges, a \$40 billion market and growing. Through a series of field experiments, we find that setting the reserve price increases publisher's revenues by 32%, thereby affirming the importance of reserve price in maximizing publisher's revenues from auctions. Further, we find that advertisers increase their bids in response to an experimental increase in reserve price, and show this behavior is consistent with the use of a minimum impression constraint to ensure advertising reach.

Based on this insight, we construct an advertiser bidding model and use it to infer the overall demand curve for advertising as a function of reserve prices. Using this demand model, we solve the publisher pricing problem. Incorporating the minimum impression constraint into the reserve price

setting process yields a 50% increase over a solution that does not incorporate the constraint, and an additional increase in profits of nine percentage points.

- **Monetizing Online Marketplaces**

with Carl F. Mela

**Abstract:** This paper considers the monetization of online marketplaces. These platforms trade-off fees from advertising with commissions from product sales. While featuring advertised products can make search less efficient (lowering transaction commissions), it incentivizes sellers to compete for better placements via advertising (increasing advertising fees). We consider this trade-off by modeling both sides of the platform. On the demand side, we develop a joint model of browsing (impressions), clicking, and purchase. On the supply side, we consider sellers' valuation and advertising competition under various fee structures (CPM, CPC, CPA) and ranking algorithms.

Using buyer, seller, and platform data from an online marketplace where advertising dollars affect the order of seller items listed, we find that ranking items by consumer utility lowers platform's profits as it leads to more lower price item purchases. Combining a ranking algorithm that sorts items by expected sales revenue with a CPC auction limited to the top 5 positions improves profits the most, because this practice monetizes the highest valuations for advertising on top, while enhancing the transaction revenues in the lower positions.

- **Online Display Advertising Markets: A Literature Review and Future Directions**

with Carl F. Mela, Santiago Balseiro, Adam Leary

**Abstract:** This paper summarizes the display advertising literature, organizing the content by the agents in the display advertising ecosystem, and proposes new research directions. In doing so, we take an interdisciplinary view, drawing connections among diverse streams of theoretical and empirical research in marketing, economics, operations, and computer science. By providing an integrated view of the display advertising ecosystem, we hope to bring attention to the outstanding research opportunities in this economically consequential and rapidly growing market.