

Wenxiao Yang

Curriculum Vitae, October 2022

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Education

- 2020–2023 **University of Illinois at Urbana-Champaign**, GPA – 3.97/4.00,
(expected) B.S., Triple Major: *Mathematics, Statistics, Economics*; Minor: *Computational Science & Engineering*.
Spring 2021: Visiting Research Student at HKUST Business School
- 2018–2020 **Zhejiang University**, Undergraduate coursework,
Experimental Class of Social Science (Major Economics), [transferred to UIUC].
Spring 2020: GEM Trailblazer Exchange Student at Nanyang Technological University

Quantitative Marketing Research Projects

- Ongoing **Privacy-protected Online Advertising: Information Design in Auctions with Flexible Information Acquisition**, Supervised by Prof. Yunchuan (Frank) Liu (UIUC) and Prof. Song Lin (HKUST).

- Topic: Quantitative Marketing; Method: Game theoretical modeling
- Presented at *ISMS Marketing Science Conference 2022*
- Submitted as Writing Sample

Abstract:, In auctions, bidders learn information about products in two ways: provided by sellers and acquired by themselves. We consider a model where bidders' information about a product is obtained in both ways. We build a model that characterizes a seller that has information about the product but lacks the ability to distinguish between bidders and two bidders who can receive information from the seller's public signals and acquire information by themselves flexibly. The seller can release public signals to bidders and bidders decide whether to participate in the auction and their information acquisition strategies. If they participate in the auction, they bid based on their beliefs of the product's value updated by the information they acquired. The setting of releasing public signals is consistent with the reality that platforms can't use users' personal data to help advertisers target which is caused by the ban on third-party cookies. We find that public signals with both low expected product value and high expected product value discourage bidders from participating in the auction. As a result, sellers mix low-value and high-value information up to the maximum threshold that allows two bidders to participate. This threshold of information is independent of the value distribution of the product but decreases as the cost per unit of information to bidders increases. We also find that in some cases, bidders' profits decrease as their information cost decreases. And sellers may try to increase bidders' information costs when the expected lot value is low and decrease them when the expected lot value is high. We find that bidders' information acquisition behavior may have a positive externality on other bidders which may lead bidders who spend more cost to obtain information finally receive fewer profits. These results provide instructions about how online platforms should design keywords in online advertising and adjust the efficiency of analytical tools that help advertisers bid. We also show that advertising for products with medium proportions of targeting consumers is less profitable for advertisers than advertising for products with low or high proportions of targeting consumers. In the extension, motivated by the discussion about the importance of first-party data in the world without third-party cookies, we consider the situation of asymmetric pre-auction information. Contrary to popular belief that extra private information can benefit advertisers, we find that sufficient information generated by first-party data may harm both the advertiser who owns the data and its competitors. Because the extra private information can prevent advertisers from acquiring private information and give room to the platform to extract profits by designing keywords with high quality.

- Ongoing **Green Product Promotion with Social Self-consciousness**, with Xuhang Fan (Duke) and Ariana Yu (UIUC).

- Topic: Quantitative Marketing, Behavioral IO; Method: Game theoretical modeling + Experiment

Abstract:,

- 2021 Spring **Advertising Coupon**, Supervised by Prof. Song Lin (HKUST).

- Topic: Quantitative Marketing; Method: Game theoretical modeling

Abstract:, We build a new promotional model that combines coupons and advertising. Customers can help the company with advertising in exchange for coupons. We compare this program with other types of referral programs and discounts. If the profit from selling the product is low, the program is always profitable compared to other promotional methods. However, if the profit from selling the product is relatively high, in which case the company will use the program when the consumer values the product very low or very high, and it will use discounts when the consumer values it moderately.

Experience

- Ongoing **Research Student**, *GIES COLLEGE OF BUSINESS, UIUC*.
- Conduct an independent quantitative marketing research project under the supervision of Professor Yunchuan Liu.
- 2021 Spring **Visiting Research Student**, *DEPARTMENT OF MARKETING, HKUST*.
- Conduct an independent quantitative marketing research project under the supervision of Professor Song Lin.
- 2020 Fall **Research Associate**, *ILLINOIS RISK LAB, DEPARTMENT OF MATHEMATICS, UIUC*.
- Topic: Financial Mathematics, Stochastic Optimization
 - Research associate in the program of *AI-Powered Life-cycle Financial Planning* lead by Prof. *Zhiyu (Frank) Quan* and Prof. *Runhuan Feng*.
 - This project aims to build algorithms that optimize decision making process for meeting important financial goals in life. I played a pivotal role in the group that working on develop life cycle strategy in asset management.
 - 1. Built a Stochastic Linear Programming model independently to optimize the expected utility under uncertainties (factors including death rate, the interest rate of risk asset.) with heterogeneous goals. 2. Assist in implementing the model by utilizing Python.
- 2019 Summer **Risk Management Intern**, *WANXIANG TRUST*.

Core Coursework

- 2020–2022 **University of Illinois at Urbana-Champaign**.
- Economics and Business*
- ECON437 Game Theory
 - ECON471 Intro to Applied Econometrics
 - ECON490 Numerical Methods in Economics
 - ECON530 Microeconomic Theory I (PhD Micro Sequence)
 - BADM539 Math Models in Marketing (Analytical Modeling PhD seminar)
- General Mathematics and Statistics*
- STAT410 Statistics and Probability II (Mathematical Statistics)
 - MATH416 Abstract Linear Algebra
 - MATH417 Intro to Abstract Algebra
 - STAT425 Statistical Modeling I (Applied Regression and Design)
 - STAT426 Statistical Modeling II (Sampling and Categorical Data)
 - STAT433 Stochastic Processes
- Optimization and Operations Research*
- MATH482 Linear Programming
 - MATH484 Nonlinear Programming
 - ECE490 Introduction to Optimization
 - IE516 Pricing and Revenue Management (Revenue Management PhD seminar)
 - IE598 Game Theory and Fair Division (Algorithmic Game Theory PhD seminar)
- Computation and Learning*
- MATH357 Numerical Methods I
 - STAT430 Fundamentals of Deep Learning
 - MATH490 Computational Math (computations on graphs, computational topology, quantum computing, etc.)
 - ECE566 Computational Inference and Learning (Computational methods in ML for ECE PhD)
- 2020 Spring **Nanyang Technological University (Singapore)**.
- MATH3100 Real Analysis I
 - MATH3110 Ordinary Differential Equation
 - HE2022 Industrial Organization
- 2018–2020 **Zhejiang University (China)**.
- Mathematics: Calculus, Linear Algebra, Probability Theory and Mathematical Statistics, Complex Function and Integral Transforms
 - Social Science: Microeconomics, Macroeconomics, Intro to Psychology, Intro to Brain and Mind
 - Management: Intro courses of Finance, Accounting and Management
 - Programming courses of C, Python, Statistical Analysis

Skills

- Skills: Python, LaTeX, R, C, MATLAB.
- Languages: Chinese (native), English (fluent)

Extra Activities

- 2018–2019 **Zhejiang University Student Press Corps**, *Student Reporter*.
2018–2019 **Marketing Association of Zhejiang University**, *Student Member*.

References

Song Lin,

Associate Professor,

Hong Kong University of Science and Technology, Hong Kong,

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Yunchuan (Frank) Liu,

Associate Professor,

University of Illinois at Urbana-Champaign, IL,

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James C. Edenfield Chair and Professor,

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