**YUYAN WANG**

Graduate School of Business

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**EDUCATION**

**Princeton University, Princeton, NJ** *Sept. 2012 - June 2016*

* **Ph.D.** in Statistics, Department of Operations Research & Financial Engineering
* Thesis: Robust High-Dimensional Regression and Factor Models. GPA: 4.0/4.0
* Advisor: Prof. Jianqing Fan

**University of Science and Technology of China (USTC), Hefei, China** *Sept. 2008 - July 2012*

* **B.S Honors** in Statistics, Special Class for the Gifted Young (4-year undergrad program for talented youths under 16 years old). GPA: 3.95/4.0
* Awards: Guo Moruo Scholarship (<1%, highest award for undergrad) and National Scholarship (<1%, twice)

**RESEARCH INTERESTS**

**Topics:** Machine Learning, Recommender Systems and Personalization, Consumer Modeling, Long-Term Optimization, Algorithmic Fairness

**Methodologies:** Deep Learning, Reinforcement Learning, Statistical Machine Learning, High-Dimensional Statistics, Causal Inference, Field Experiment, Big Data Analytics

**INDUSTRY EXPERIENCE**

**Google Brain, Mountain View, CA** *Oct. 2019 – May 2023*

* **Senior Researcher** at Google Brain. Selected projects:

**Surrogate for Long-Term Consumer Experience in Recommender Systems**

* Developed a framework to identify sequential and temporal consumer behavior patterns that are predictive of long-term consumer experience in recommender systems, which is a sparse, noisy and long-horizon signal that is hard to optimize directly. Online large-scale field experiments on an RL-based recommendation system demonstrated significant improvements in key business metrics including consumer growth and retention, achieving 20% of the annual goal of a 10-person team.
* Paper[5] accepted to KDD 2022. Quote from a Vice President at Google: “This is an excellent paper. I think the entire Core Experiences team (900+ employees) would benefit from reading it, and I would like to send it to everyone in the Core Experiences team.”

**Understanding and Modeling Consumer Intent for Long-Term Optimization**

* Developed a framework for extracting consumer intents (e.g. exploration or variety-seeking intent) on the personalized platforms, and designed RL policies to plan accordingly at longer time horizons.
* Designed a hierarchical reinforcement learning (HRL) based method for learning consumer intents at different temporal abstraction levels (e.g. user-level intent vs. session-level intent).
* [Invited talk at Recsys 2022](https://sites.google.com/corp/view/consequences2022/invited-speakers?authuser=0). Work deployed at Google.

**Uber Technologies Inc., San Francisco, CA** *Sept. 2016 - Sept. 2019*

* ***Senior Applied Scientist****: 02/2018 - 09/2019;* ***Applied Scientist II****: 09/2016 - 01/2018*
* **Tech lead** on Uber Eats home feed ranking and recommendation; Founding member of Uber Eats Data Science team which became a team of 80+ during my time there. Selected projects:

**Multi-Objective Recommendation for a Three-Sided Marketplace**

* Developed a personalized multi-objective optimization framework for Uber Eats restaurant recommendation. Online A/B experiments showed significant increases in consumer retention, basket value and orders for global markets, which translate to $xx million weekly gain in revenue. My work was deployed globally at Uber Eats.
* Patented the work as first author.
* Media Coverage: First-authored [tech blog](https://eng.uber.com/uber-eats-recommending-marketplace/) was selected as [top 10 machine learning articles of the month](https://medium.mybridge.co/machine-learning-top-10-articles-for-the-past-month-v-oct-2018-ca24dadbe495) (0.7%) by an independent publisher. Won “Most Impressive Business Impact” award by Uber.

**Holistic Optimization with Heterogeneous & Hierarchical Contents**

* Proposed and developed *HRank*, a holistic recommendation framework for personalized optimal homepage layout, combining machine learning and probabilistic modeling for consumers’ browsing behavior on heterogeneous and hierarchical contents.
* *HRank* was deployed globally, which brought a significant increase in consumer conversion rate, amounting to $xx million weekly gainin revenue.
* My work was featured in Uber’s company-wide Machine Learning Orientation video which was circulated among 500+ ML engineers and applied scientists.

**Microsoft Research, Redmond, WA** *June 2015 - Aug. 2015*

* ***Research Intern*** at Internet Services & Research Center

**Morgan Stanley, New York City, NY** *June 2014 - Aug. 2014*

* Strategies & Modeling ***Summer Associate***

**Chinese Academy of Sciences (CAS), Beijing, China** *Feb. 2012 - June 2012*

* ***Research Intern*** at Academy of Mathematics and Systems Science

**University of California, Los Angeles (UCLA), Los Angeles, China** *July. 2011 - Sept. 2011*

* ***Cross-disciplinary Scholars*** *in Science and Technology (CSST) program,* winner of CSST Award (6/90)

**WORKING PAPERS**

* Wang, Y., Tao L., Zhang X.. “Recommending for a Three-Sided Food Delivery Marketplace: A Multi-Objective Hierarchical Approach.”
  + *Major Revision (1st round review) at Marketing Science.* ***Best Paper Award*** *at* [*CIST 2022*](https://sites.google.com/corp/view/cist2022/)*.*
* Li, P.,Wang, Y., Chi, E.H., Chen, M.“Prompt Tuning Large Language Models on Personalized Aspect Extraction for Recommendations.” *arXiv preprint arXiv:2306.01475.*
* Li, P.,Wang, Y., Chi, E.H., Chen, M. “Hierarchical Reinforcement Learning for Modeling User Novelty-Seeking Intent in Recommender Systems.” *arXiv preprint arXiv:2306.01476.*

**JOURNAL PUBLICATIONS**

* Li, Q., Cheng, G., Fan, J., Wang, Y.(2018). “Embracing the Blessing of Dimensionality in Factor Models.” *Journal of the American Statistical Association, 113.521 (2018): 380-389.* ***(JASA).***
* Fan, J., Li, Q., Wang, Y. (Alphabetical order)(2017). “Estimation of High-Dimensional Mean Regression in Absence of Symmetry and Light-tail Assumptions.” *Journal of the Royal Statistical Society: Series B (Statistical Methodology) 79.1 (2017): 247-265. (****JRSS-B****).*
* Lin, N., Jing, R., Wang, Y., Yonekura E., Fan, J., Xue, L. (2017). “A statistical investigation of the dependence of tropical cyclone intensity change on the surrounding environment.” *Monthly Weather Review, 145 (7), 2813-2831.*

**CONFERENCE PUBLICATIONS**

* Chang B.,Karatzoglou A., Wang, Y.**,** Xu, C., Chi, E.H., Chen, M.. “Latent User Intent Modeling for Sequential Recommenders.” *Proceedings of the ACM Web Conference 2023 (theWebConf 2023).*
  + *Full paper with oral presentation; Acceptance rate: 19.8%.*
* Wang, Y., Sharma, M., Badam, S., Xu, C., Sun, Q., Richardson, L., Chung, L., Chi, E.H., Chen, M.. “Surrogate for Long-Term User Experience in Recommender Systems.” *Proceedings of the 28th ACM SIGKDD Conference on Knowledge Discovery & Data Mining (KDD 2022).*
  + *Top computer science conference. Full paper with oral presentation; Acceptance rate: 15.0%.*
  + *Work was highlighted by* [*an invited talk at KDD 2022*](https://www.kdd.org/kdd2022/ADSSpeaker.html)*.*
  + *Short version accepted to BayLearn 2022.*
* Wang, Y., Tao L., Zhang X.. “Recommending for a Multi-Sided Marketplace with Heterogeneous Contents.” *Sixteenth ACM Conference on Recommender Systems (Recsys 2022).* 
  + *Top Recommender Systems conference. 4-page short paper with oral presentation; Acceptance rate: 28.0%. Media coverage:* [*Shaped*](https://www.shaped.ai/blog/day-2-of-recsys2022-our-favorite-5-papers-and-talks)*.*
* Wang, Y., Zhao, Z., Dai B., Fifty, C., Lin, D., Hong L., Li, W., Chi, E.H.. “Can Small Heads Help? Understanding and Improving Multi-Task Generalization.” *Proceedings of the ACM Web Conference 2022 (WWW / theWebConf 2022).*
  + *Full paper with oral presentation; Acceptance rate: 17.7%.*
* Wang, J., Le, Y., Chang, B., Wang, Y., Chi, E.H., Chen, M.. “Learning to Augment for Casual User Recommendation.” Proceedings of the ACM Web Conference 2022 (**WWW / theWebConf 2022**).

*Full paper with oral presentation; Acceptance rate: 17.7%.*

[11] Oberst, M., D'Amour A., Chen M., Wang, Y., Sontag D., Yadlowsky S. Bias-robust Integration of Observational and Experimental Estimators. American Causal Inference Conference (**ACIC 2022**).

***Top conference in Causal Inference****.* ***Journal*** *version on arXiv:* [*https://arxiv.org/pdf/2205.10467.pdf*](https://arxiv.org/pdf/2205.10467.pdf)*.*

[10] **Wang, Y.**, Wang, X., Beutel, A., Prost, F., Chen, J., Chi, E. H.. “Understanding and Improving Fairness-Accuracy Trade-offs in Multi-Task Learning.” Proceedings of the 27th ACM SIGKDD Conference on Knowledge Discovery & Data Mining **(KDD 2021)**.

***Top conference in Computer Science****. Full paper with oral presentation; Acceptance rate: 15.4%.*

*Short version accepted to BayLearn 2021 (****top*** *ML conference in the Bay Area).*

[9]Chen, M., **Wang, Y.**, Xu C., Le, Y., Sharma, M., Richardson, L., Wu S., Chi, E.H.. “Values of User Exploration in Recommender Systems.”Fifteenth ACM Conference on Recommender Systems **(Recsys 2021).**

***Top conference in Recommender Systems****. Full paper with oral presentation; Acceptance rate: 18.4%.*

[8]Chen, Z., **Wang, Y.**, Lin, D., Cheng, D.Z., Hong, L., Chi, E.H., Cui, C.. “Beyond Point Estimate: Inferring Ensemble Prediction Variation from Neuron Activation Strength in Recommender Systems.” Proceedings of the 14th ACM International Conference on Web Search and Data Mining**(WSDM 2021).**

*Full paper with oral presentation; Acceptance rate: 18.6%.*

**PATENTS & BLOGS**

[7] **Wang, Y.**, Zhang, X., Liu, I., Ning, Y., Peng, C. (2021). “Multi-layer Optimization for a Multi-sided Network Service.” **U.S. Patent No. 11,127,066**. Washington, DC: U.S. Patent and Trademark Office.

*Patent for work at Uber.*

[6] Zhang, X., Zhang, S., **Wang, Y.**, Gogate, M., Ning, Y., Peng, C. Liu, I., Lee, C. (2021). “Optimizing Listing Efficiency and Efficacy for a Delivery Coordination System.” **U.S. Patent No. 11,157,579**. Washington, DC: U.S. Patent and Trademark Office.

*Patent for work at Uber.*

[5] **Wang, Y.**, Ning, Y., Liu, I., Zhang, X. (2018). “Food Discovery with Uber Eats: Recommending for the Marketplace.” **Uber Engineering Blog.**

***Media coverage****: Selected as* [*Top 10 machine learning articles of the month*](https://medium.mybridge.co/machine-learning-top-10-articles-for-the-past-month-v-oct-2018-ca24dadbe495) *(0.7%) by an independent publisher.*

**INVITED TALKS & CONFERENCE PRESENTATIONS**

“Recommending for a Three-Sided Food Delivery Marketplace: A Multi-Objective Hierarchical Approach.” Global Institute for Artificial Intelligence & Business Analytics, Fox School of Business, Temple University, April 2023.

“Surrogate for Long-Term User Experience in Recommender Systems.” Twitter ML seminar series. December 2022.

“Can Small Heads Help? Understanding and Improving Multi-Task Generalization.” Snap Inc TechTalks. November 2022.

“Surrogate for Long-Term User Experience in Recommender Systems.” Bay Area Machine Learning Symposium (BayLearn) 2022. South San Francisco, CA, October 2022.

“Recommending for a Three-Sided Food Delivery Marketplace: A Multi-Objective Hierarchical Approach.” 2022 INFORMS Annual Meeting. Indianapolis, IN, October 2022.

“Recommending for a Three-Sided Food Delivery Marketplace: A Multi-Objective Hierarchical Approach.” Conference on Information Systems and Technology (CIST) 2022. Indianapolis, IN, October 2022 (***Best Paper Award***).

“Long-Term Planning for Recommender Systems.” CONSEQUENCES+REVEAL '22: Causality, Counterfactuals, Sequential Decision-Making & Reinforcement Learning,16th ACM Conference on Recommender Systems (Recsys 2022 Workshop). Seattle, WA, September 2022 ([***Invited Speaker and Panelist***](https://sites.google.com/corp/view/consequences2022/invited-speakers?authuser=0)).

“Recommending for a Multi-Sided Marketplace with Heterogeneous Contents.” 16th ACM Conference on Recommender Systems (Recsys 2022). Seattle, WA, September 2022.

“Moonshot Ally: Assistive Machine Learning for Long-Term User Journeys.” Google Brain Summit. Mountain View, CA, September 2022.

“Surrogate for Long-Term User Experience in Recommender Systems.” Google Search, Mountain View, CA, September 2022.

“Surrogate for Long-Term User Experience in Recommender Systems.” 28th ACM SIGKDD Conference on Knowledge Discovery and Data Mining. Washington DC, August 2022.

“Understanding and Improving Fairness-Accuracy Trade-offs in Multi-Task Learning.” Mays Business School, Texas A&M University. July 2022.

“Recommending for a Three-Sided Food Delivery Marketplace: A Multi-Objective Hierarchical Approach.” **ISMS Marketing Science Conference 2022**. Virtual Event, June 2022.

“Understanding and Improving Fairness-Accuracy Trade-offs in Multi-Task Learning.” **ISMS Marketing Science Conference 2022**. Virtual Event, June 2022.

“Can Small Heads Help? Understanding and Improving Multi-Task Generalization.” ACM The Web Conference 2022. Lyon, France, April 2022.

“Surrogate for Long-Term User Experience in Recommender Systems.” Google Research Brain Dump. Virtual Event, February 2022.

“Understanding and Improving Fairness-Accuracy Trade-offs in Multi-Task Learning.” Bay Area Machine Learning Symposium (BayLearn) 2021. Virtual Event, October 2021.

“Improving Long-term User Conversion via Surrogate Reward in a REINFORCE Recommender System.” Google Research Conference 2021. Virtual Event, October 2021.

“Improving Long-term User Conversion via Surrogate Reward in a REINFORCE Recommender System.” Google Research Reinforcement Learning Workshop, Virtual Event, July 2021.

“Understanding and Improving Fairness-Accuracy Trade-offs in Multi-Task Learning.” 27th ACM SIGKDD Conference on Knowledge Discovery and Data Mining. Virtual, Singapore, August 2021.

“Understanding and Improving Fairness-Accuracy Trade-offs in Multi-Task Learning.” Faire, Data Team. Virtual Meeting, San Francisco, CA, July 2021.

“From User Understanding to User Conversion”. Google Research, Brain Team. Mountain View, CA. May 2021.

“Food Discovery with Uber Eats: Holistic Multi-Objective Optimization for the Marketplace.” SigOpt. San Francisco, CA, August 2019.

“Food Discovery with Uber Eats: Recommending for the Marketplace.” Facebook Research, Core Data Science Team. Menlo Park, CA, June 2019.

“Food Discovery with Uber Eats: Holistic Multi-Objective Optimization for the Marketplace.” Airbnb. San Francisco, CA, June 2019.

“Uber Eats Restaurant Ranking and Recommendation.” Moving the World with Data Meetup. San Francisco, CA, October 2018.

“Uber Eats Restaurant Ranking and Recommendation.” AI Applications @ Uber Eats Meetup. San Francisco, CA, October 2017.

“Robust Approximate Lasso for High-Dimensional Regression.” IBM Thomas J. Watson Research Center. Yorktown Heights, NY, February 2016.

“Estimation of High-Dimensional Mean Regression in the Absence of Symmetry and Light-Tail assumptions.” Department of Biostatistics, Yale University. New Haven, CT, September 2015.

“Bayesian time series for online query frequency prediction.” Internet Services & Research Center, Microsoft Research, Redmond, WA, August 2015.

“Estimation of High-Dimensional Mean Regression in the Absence of Symmetry and Light-Tail assumptions.” 2015 Joint Statistical Meetings (JSM), Seattle, WA, August 2015.

“Robust Estimation of High-Dimensional Mean Regression.” NSF Workshop for Empr Process and Mod Stat Decision Theory. New Haven, CT, May 2015.

**TEACHING EXPERIENCE**

**Guest Lecture / Tutorials**

* Recommender Systems: Algorithms & Applications. *Fuqua School of Business, Duke University.* *Feb. 2023*
* A Gentle Introduction to Recommender Systems. *Stern School of Business, New York University.*  *June 2022*
* A Gentle Introduction to Recommender Systems. *Heinz College, Carnegie Mellon University.* *Sept. 2021*
* Experimentation and A/B Testing Best Practices. *Uber Technologies.* *Oct. 2018*

**Mentorship**

* Mentor for Undergraduate Consortium at KDD 2022 (KDD-UC) *June 2022 - present*
* [CSRMP](https://research.google/outreach/csrmp/) mentor for 3 grad & undergrad students from historically marginalized groups *Nov. 2021 - present*
* Mentor for one **student researcher** and two **interns** at Google Brain *May 2021 – present*
* Mentor for two **full-time** team members and one **intern** at Uber. *June 2017 - Sept 2019*

**Assistant Instructor at Princeton University**

* ORF 504: Financial Econometrics *Spring 2016*
* ORF 245: Fundamentals of Statistics *Spring 2014, Spring 2015, Fall 2015*
* ORF 405: Regression and Applied Time Series Analysis *Fall 2013, Fall 2014*

**PROFESSIONAL & ACADEMIC SERVICES**

**Reviewer**: Recsys, KDD, NeurIPS, ICML, CIKM, TheWebConf. *2019 - Present*

**Reviewer**: Google PhD Fellowship. *2021 – Present*

Tech recsys member

**Session chair**, Conference on Information Systems and Technology (CIST) 2022. *June 2022*

**Organizer** and **session chair**, Workshop on Action, Task and User Journey Modeling. *Oct 2022*

**Session chair**, ISMS Marketing Science Conference 2022. *June 2022*

**Session chair**, Long-term Dynamics for Responsible Recommendation Systems Workshop’21. *Nov. 2021*

**TPC member**, Reinforcement Learning for Real Life (RL4RealLife) Workshop @ ICML 2021. *July 2021*

**SELECTED AWARDS**

Best Paper Award, CIST 2022 *Oct. 2022*

Cummins Merit Fellowship, Princeton University *Jan. 2013*

Guo Moruo Scholarship, USTC (<1%, highest award for undergrad) and National Scholarship (<1%, twice) *May 2012*

Outstanding Research Award, USTC *Feb. 2012*

CSST Award, UCLA *Sept. 2011*

National Scholarship, Ministry of Education of China (<1%) *Nov. 2010*, *Nov. 2009*

**SKILLS**

**Programming skills**: Python (proficient), R (proficient), TensorFlow (proficient), Hive, SQL, Spark, C/C++, Matlab, q/kdb+

**Languages**: Mandarin (native), English (fluent)

**OTHERS**

BrainSTAR Women Steering Committee at Google Brain *2022 - 2023*

Member of WiSDOM (Women in Statistics, Data, Optimization and Machine Learning) at Uber *2018 - 2019*

Organizer of Discovery team Lunch & Learn, Eater Data Science reading group at Uber *2017 - 2019*

Organizer of Wilks Statistics Seminar at Department of ORFE at Princeton University *2015 - 2016*

Vice President of Student Union of School for Gifted Young at USTC *2011 - 2012*