Zexi Huang

Staff Machine Learning Scientist at TikTok

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Education

College of Engineering, University of California, Santa Barbara (UCSB)

Santa Barbara, USA

Doctor of Philosophy and Master of Science in Computer Science — *Sep. 2018 - Jun. 2023*

- Course GPA: 4.0/4.0, UCSB Computer Science *Outstanding Scholar* Fellow (top 4 out 63 PhD students).
- Advisor: Prof. Ambuj Singh. Dissertation: Learning Representations for Information-rich Graphs.

Yingcai Honors College, University of Electronic Science and Technology of China (UESTC)

Chengdu, China

Bachelor of Engineering in Computer Science and Technology (Honors) — *Sep. 2014 - Jun. 2018*

- GPA: 3.96/4.0, Avg. Score: 92.79/100 (*1/90* in freshman year, *1/87* in sophomore year, *1/93* in junior year).
- Recipient of *the Most Outstanding Students Awards* of UESTC (top 10 out of 5,000 seniors).
- Advisors: Prof. Junming Shao and Prof. Sinno Jialin Pan. Thesis: Transfer Learning for Community Detection in Multiplex Networks.

Industry Experience

Staff Machine Learning Scientist, Livestreaming Recommendation, TikTok

San Jose, USA

Driving Next-generation Recommender Systems for TikTok Live — *Jan. 2026 - Present*

- Leading a cross-functional team of machine learning, infrastructure, and platform engineers to design, build, and scale next-generation recommender systems, owning key initiatives including VLM/LRM co-training, LLM4Rec, and generative recommendation.

Senior Machine Learning Scientist, Livestreaming Recommendation, TikTok

San Jose, USA

Scaling Billion-scale Recommendation Models with Multi-domain Multi-modal Signals for TikTok Live — *Jan. 2025 - Dec. 2025*

- Designed and deployed a novel feature interaction architecture that scales up the ranking baseline by 50x, achieving +1%/-1% in CTR AUC/Logloss and +10%/+8% in Quality Watch Session/Duration / User, with superior scaling laws compared to state-of-the-art methods.
- Incorporated user behavioral information from other domains (short videos, e-commerce, and search) with graph representation learning.
- Encoded visual, ASR, and metadata information from the content with vision-language models to improve model generalizability.

Machine Learning Scientist, Livestreaming Recommendation, TikTok

San Jose, USA

Ranking and Host Experience Optimization for TikTok Live Recommendation — *May. 2023 - Dec. 2024*

- Owned the iterations of the core ranking models of TikTok Live Recommendation, leveraging representation learning, multi-task learning, contrastive learning, regression modeling, and sequence modeling, with +7% Watch Duration / User gains from online A/B experiments.
- Developed the host go-live model that captures the relationship between watch-live and go-live with causal inference and uplift modeling to motivate authorized hosts to go-live, achieving +2% Host Session / User in online A/B experiments.

Applied Scientist Intern, Books Tech, Amazon

San Diego, USA

Stochastic Inventory Management for Print-On-Demand and Graph-based Text Classification for Content Intelligence — *Jun. 2022 - Sep. 2022*

- Developed a stochastic inventory management model based on dynamic programming for Amazon's Print-On-Demand business, optimizing the ordering strategy for 42.2M units of books and realizing an annual saving of $10.4M.
- Designed and implemented a graph-based NLP model for long text embedding and classification using graph neural networks, leading to superior performance to state-of-the-art transformer-based models for Kindle book contents.

Applied Scientist Intern, Books Tech, Amazon

San Diego, USA

Graph-based Fraud Detection in Kindle Direct Publishing — *Jun. 2021 - Sep. 2021*

- Designed graph-based machine learning models for fraud detection based on multi-modal signals in Kindle Direct Publishing.
- Implemented the models in an end-to-end fashion and deployed them to graphs with millions of nodes and billions of edges in production.
- Validation results show that the models can surface fraud rings undetected by existing processes with an estimated annual value of $2.4M.

Applied Scientist Intern, Books Tech, Amazon

San Diego, USA

Graph-based Fraud Detection in Kindle Direct Publishing — *Jun. 2020 - Sep. 2020*

- Proposed to augment existing fraud detection methods with graph-based machine learning models for Kindle Direct Publishing.
- Designed and implemented various heuristics and an embedding framework for attributed heterogeneous multiplex networks.
- The models are deployed into production and results show that they surface up to 15 times more fraud compared to the existing processes.

Publications

[KDD-2027] Ruifeng Zhang*, **Zexi Huang***†, Zikai Wang*, Ke Sun* et al. ***Zenith: Scaling up Ranking Models for Billion-scale Livestreaming Recommendation***. *ACM SIGKDD Conference on Knowledge Discovery & Data Mining*, 2027.

[KDD-2027] Blake Gella*, Wei Wu*, Yuhao Yin*, **Zexi Huang***†, et al. ***PEARL: Unbiased Percentile Estimation via Contrastive Learning for Billion-Scale Livestreaming Recommendation***. *ACM SIGKDD Conference on Knowledge Discovery & Data Mining*, 2027.

[RecSys-2026] Rose Yuan*, **Zexi Huang***†, Anjia Cao*, Xudong Lu*, et al. ***FLUID: From Ephemeral IDs to Multimodal Semantic Codes for Billion-Scale Livestreaming Recommendation***. *ACM Conference on Recommender Systems*, 2026.

[KDD-2025] João Mattos, **Zexi Huang**, Mert Kosan, Ambuj Singh, Arlei Silva. ***Attribute-Enhanced Similarity Ranking for Sparse Link Prediction***. *ACM SIGKDD Conference on Knowledge Discovery & Data Mining*, 2025.

[TIST-2025] Mert Kosan*, **Zexi Huang***, Sourav Medya, Sayan Ranu, Ambuj Singh. ***GCFExplainer: Global Counterfactual Explainer for Graph Neural Networks***. *ACM Transactions on Intelligent Systems and Technology*, 2024.

[AAAI-2024] Aritra Bhowmick, Mert Kosan, **Zexi Huang**, Ambuj Singh, Sourav Medya. ***DGCLUSTER: A Neural Framework for Attributed Graph Clustering via Modularity Maximization***. *AAAI Conference on Artificial Intelligence*, 2024.

[WSDM-2023] **Zexi Huang***, Mert Kosan*, Sourav Medya, Sayan Ranu, Ambuj Singh. ***Global Counterfactual Explainer for Graph Neural Networks***. *ACM International Conference on Web Search and Data Mining*, 2023. **Selected as one of the top 10 best papers of the conference and best paper of the MLoG workshop.**

[WSDM-2022] **Zexi Huang**, Arlei Silva, Ambuj Singh. ***POLE: Polarized Embedding for Signed Networks***. *ACM International Conference on Web Search and Data Mining*, 2022.

[KDD-2021] **Zexi Huang**, Arlei Silva, Ambuj Singh. ***A Broader Picture of Random-walk Based Graph Embedding***. *ACM SIGKDD Conference on Knowledge Discovery & Data Mining*, 2021.

(*: equal contribution/core contributors, †: corresponding author)

Research Projects

Attribute-Enhanced Similarity Ranking for Sparse Link Prediction

Advisor: Prof. Ambuj Singh, Collaborators: João Mattos, Mert Kosan, Arlei Silva — *May. 2021 - Aug. 2024*

- Scrutinized the training and evaluation of supervised link prediction methods and identify their limitations in handling class imbalance.
- Proposed a novel topology-centric framework that combines graph learning, topological heuristics, and an N-pair loss for link prediction.
- Results showed that the proposed method is 145% more accurate and trains/infers 11/6,000 times faster than the state-of-the-art methods.

Global Counterfactual Explanation for Graph Neural Networks

Advisor: Prof. Ambuj Singh, Collaborators: Mert Kosan, Sourav Medya, Sourav Medya, Sayan Ranu — *Oct. 2021 - Jun. 2024*

- Formulated the novel problem of global counterfactual reasoning/explanation of graph neural networks for graph classification.
- Proposed GCFExplainer, the first global explainer powered by vertex-reinforced random walks on an edit map with a greedy summary.
- Results showed that GCFExplainer not only provides crucial high-level insights but also outperforms existing methods in recourse quality.

Signed Embedding for Polarized Graphs

Advisor: Prof. Ambuj Singh, Collaborator: Arlei Silva — *Oct. 2020 - Aug. 2021*

- Designed a novel polarization measure for signed graphs and showed that existing methods fail in polarized signed link prediction.
- Proposed a polarized embedding algorithm that captures both topological and signed similarity jointly via signed autocovariance.
- Extensive experiments showed that the proposed model outperforms state-of-the-art methods by up to one order of magnitude.

Graph Representation Learning Based on Random-walks

Advisor: Prof. Ambuj Singh, Collaborator: Arlei Silva — *Sep. 2018 - Feb. 2021*

- Presented a unified view of embedding, covering different random-walk processes, similarity metrics, and embedding algorithms.
- Showed both theoretical and empirical evidence of the superiority of the novel autocovariance embedding in link prediction.
- Illustrated ways to exploit the multiscale nature of random-walk similarity to further optimize embedding performance.

Academic Services

Registration Chair	KDD'23
Program Committee	RecSys'26, AAAI'23-25, KDD'22, SDM'22
Reviewer	TNNLS'23, Neural Networks'23, TIST'22-26, TKDD'21-24, KDD'20-21, WebConf'21