

# Yifan Zhang

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## EDUCATION

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### Vanderbilt University

*Ph.D. in Computer Science, Specialize in AI for Software Engineering*

*Nashville, TN, USA*

*Jun. 2022 – Apr. 2026 (Expected)*

- Advisors: Dr. Kevin J. Leach & Dr. Yu Huang

### Georgia Institute of Technology

*M.Sc. in Computer Science, Specialize in Computing Systems*

*Atlanta, GA, USA*

*Aug. 2022 – Jun. 2025*

- Studied Machine Learning & Software Engineering

### China University of Petroleum

*M.Eng. in Petroleum Engineering, Specialize in Industrial & System Engineering*

*Beijing, CN*

*Sep. 2012 – Jun. 2019*

- Double majored in English (TEM-8 holder) & Minor in British Parliamentary Debate

## PUBLICATION

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### Book Chapters

- [B1] **Yifan Zhang**: Federated Feature Engineering in *Federated Learning: Technology and Practice*. Electronic Industry Press, 2021.

### Journals

- [J1] Zachary Karas, Aakash Bansal, **Yifan Zhang**, Toby Li, Collin McMillan, Yu Huang: *A Tale of Two Comprehensions? Studying Human Attention during Code Summarization*. Under Review by ACM Transactions on Software Engineering and Methodology (**TOSEM**), 2023.
- [J2] **Yifan Zhang**, Chen Huang, Yueke Zhang, Kevin Cao, Scott Thomas Anderson, Huajie (Jay) Shao, Kevin Leach, Yu Huang: *Pre-Training Representations of Binary Code Using Contrastive Learning*. Under Review by IEEE Transactions on Software Engineering (**TSE**), 2023. [[arXiv](#)]
- [J3] Yichang He, **Yifan Zhang**, Yunpeng Fan, U-Xuan Tan: *Real-time Vibration Compensation with Long Short-term Memory Recurrent Neural Network and Adaptive Filter*. Minor Revision from IEEE Transactions on Mechatronics (**TMech**), 2023.
- [J4] Haoyu Dong, **Yifan Zhang**, Hanxue Gu, Nicholas Konz, Maciej Mazurowski: *SWSSL: Sliding-Window based Self-Supervised Learning Framework for Anomaly Detection*. IEEE Transactions on Medical Imaging (**TMI**), 2023. [[Paper](#)]
- [J5] Haoyu Dong, **Yifan Zhang**, Nicholas Konz, Hanxue Gu, Maciej Mazurowski: *A Dual-Stream Semi-Supervised Lesion Detection Framework for Breast Tomosynthesis Screening*. Under Review by Computer Methods and Programs in Biomedicine (**CMPB**), 2023.
- [J6] Jing Li, Xiangfang Li, Keliu Wu, Dong Feng, Tao Zhang, **Yifan Zhang**: *Thickness and Stability of Water Film Confined inside Nanoslits and Nanocapillaries of Shale and Clay*. International Journal of Coal Geology (**IJCG**), 2017. [[Paper](#)]

### Conferences

- [C1] **Yifan Zhang**, Jiliang (Eric) Li, Zachary Karas, Aakash Bansal, Toby Jia-Jun Li, Collin McMillan, Kevin Leach, Yu Huang: *EyeTrans: Merging Human and Machine Attention for Neural Code Summarization*. Under Review by Foundational Software Engineering (**FSE**), 2024.
- [C2] Aakash Bansal, Chia-Yi Su, Zachary Karas, **Yifan Zhang**, Yu Huang, Toby Jia-Jun Li, Collin McMillan: *Modeling Programmer Attention as Scanpath Prediction*. Accepted by Automated Software Engineering (**ASE**) New Ideas and Emerging Results, 2023. [[arXiv](#)]
- [C3] Jiliang (Eric) Li\*, **Yifan Zhang**\*, Yu Huang, Kevin Leach: *MalMixer: Few-Shot Malware Classification with Retrieval-Augmented Semi-Supervised Learning*. Resubmitting to the Advanced Computing Systems Association (**USENIX**) Security Symposium, 2024.

- [C4] Chen Huang, **Yifan Zhang**, Kevin Leach, Yu Huang, Wenqiang Lei, Jiancheng Lv: *Cross-Domain Filters for Graph Convolutional Networks by Multiple Kernel Learning*. 2nd Round Review by Annual AAAI Conference on Artificial Intelligence (**AAAI**), 2024.
- [C5] **Yifan Zhang**: *Leveraging Artificial Intelligence on Binary Code Comprehension*. Automated Software Engineering (**ASE**) Doctoral Symposium, 2022. [\[Paper\]](#) [\[arXiv\]](#)

## Workshops

- [W1] **Yifan Zhang**, Junwen Yang, Haoyu Dong, Qingchen Wang, Huajie (Jay) Shao, Kevin Leach, Yu Huang: *ASTRO: An AST-Assisted Approach for Generalizable Neural Clone Detection*. International Conference on Software Engineering (**ICSE**) Workshops, 2023. [\[arXiv\]](#)
- [W2] **Yifan Zhang\***, Haoyu Dong\*, Nicholas Konz, Hanxue Gu, Maciej Mazurowski: *Lightweight Transformer Backbone for Medical Object Detection*. International Conference on Medical Image Computing and Computer Assisted Intervention (**MICCAI**) Workshops, 2022. [\[Paper\]](#) [\[arXiv\]](#)

## Preprints

- [P1] **Yifan Zhang**, Haoyu Dong, Nicholas Konz, Hanxue Gu, Maciej Mazurowski: *REPLICA: Enhanced Feature Pyramid Network by Local Image Translation and Conjunct Attention for High-Resolution Breast Tumor Detection*. Preprint. [\[arXiv\]](#)

## ACADEMIC EXPERIENCE

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### Vanderbilt University

Graduate Research Assistant, Advisors: Dr. Kevin J. Leach & Dr. Yu Huang

Jun. 2022 – Present

Nashville, TN, USA

- **Binary Code Representation**: Built a contrastive learning method to facilitates representation learning of binary code visualized by distribution analysis, and improves the performance on all four downstream tasks of software engineering and security from 11.29% to 45.19% on average compared to state-of-the-art large-scale language representation models.
- **Domain-Guided Clone Detection**: Designed an AST-based representation for source code that leverages program structure and semantics to improve state-of-the-art code clone detection. Our experimental results show that the model improves state-of-the-art neural clone detection approaches by up to 6.6% in F-1 score.

### Duke University

Research Associate, Advisor: Dr. Maciej A. Mazurowski

Jul. 2021 – Jun. 2022

Durham, NC, USA

- **Medical Object Detection**: Designed a feature interpolation pipeline for injecting tumors into healthy images as an augmented dataset, and conjuncted a ViT on the outputs of a ResNet as inputs to a FPN in Faster R-CNN for tumor detection. The model mitigates the data-hungry problem of attention and achieves 13.1% improvement in AP50 for detecting tumors.
- **Domain Generalization**: Introduced a method for detecting anomalies in high-resolution medical images by sliding patches, and a domain generalization method by imposing constraints on the feature space and its projection space. Both of the two model achieve state-of-the-art in anomaly detection and domain generalization accuracy.

### University of Hong Kong

Senior Research Assistant, Advisor: Dr. Qingchen Wang

Mar. 2021 – Jul. 2021

Hong Kong SAR

- **Financial Decision Making**: Built an entire intelligent debt collection system using data-driven deep reinforcement learning models. The model utilizes Transformer as the feature extractor and attaches a offline policy gradient model trained on the embedded sequential-aware hidden features to propose long-term dependent decisions.

## INDUSTRY EXPERIENCE

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### ByteDance

Research Scientist Intern, Supervisor: Dr. Zhibing Zhao & Dr. Tieying Zhang

May. 2023 – Aug. 2023

San Jose, CA, USA

- **SQL Hint Recommendation**: Enhancing the SQL Pipeline through a Hint Recommendation System Based on Representation Learning: The model leverages two Transformer models in a pipeline and pretrains a generalizable model for reranking SQL plans across diverse table spaces and schemas. In preparation for VLDB 2024.

- **Action Model:** Built Bi-GRU and DeepFM models on user behavior features to predict the credit use rate and overall profit of every user in cash loan and consumer debt. The model can propose decisions to increase their credit limit for maximizing income, and achieved 21.4% overall profit increase.
- **Credit Score Propagation:** Built a heterogeneous graph on different types of user connections, and applied GNN models to propagate the credit score and improve risk prediction. The model can improve the overall accuracy of the XGB model by 5% in user classification.
- **Privacy-Preserving Collaboration:** Invented one kind of GAN-styled model using differential privacy to improve the efficiency and security of federated learning. Applied for 10 CN patents based on the research outputs, and was listed as 1st or 2nd inventor in 8 of them. One of the patents was awarded as 1st Runner-up in the 3rd JD Discovery Cup Patent Competition.

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## ACADEMIC SERVICES

### Program Committee (PC) Member

- 2024 AAAI Conference on Artificial Intelligence (AAAI)
- 2023 Conference on Machine Learning and Systems (MLSys) Artifact Evaluation Track
- 2023 International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI)
- 2023 AAAI Workshop on DL-Hardware Co-Design for AI Acceleration (DCAA@AAAI)
- 2023 International Conference on Mining Software Repositories (MSR)
- 2023 AAAI Conference on Artificial Intelligence (AAAI)
- 2022 MICCAI Workshop on Cancer Prevention through early detection (CaPTion@MICCAI)

### External Conference Reviewer

- 2024 International Conference on Very Large Data Bases (VLDB)
- 2023 USENIX Security Symposium (USENIX Security)
- 2022 IEEE/CVF Computer Vision and Pattern Recognition Conference (CVPR)

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## TEACHING AND SUPERVISION

### Teaching Assistant (TA) Experience

- CS3276/CS5276 Compiler Design at Vanderbilt University, 2023 Fall. Instructor: Dr. Kevin J. Leach.

### Supervision of Research Students

- Luka Mushkudiani, Bachelor in Mathematics & Computer Science at Vanderbilt University. From 2023 Fall to Present. Research Topic: Neural Type Systems for Python/Java
- Jiliang (Eric) Li, Bachelor in Mathematics & Computer Science at Vanderbilt University. From 2022 Summer to Present. Research Topic: Few-Shot Malware Classification

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## FUNDS AND AWARDS

### Fellowships

- 2022 Research Fellowship from Defense Advanced Research Projects Agency (DARPA) (32500\$/year)
- 2021 Research Fellowship from National Institutes of Health (NIH) (\$36000/year)
- 2017 Roberto Roca Education Fellowship (Top 10 nationwide)
- 2015 Chinese National Fellowship for Overseas Studies (CA\$6000/4 months)
- 2015 & 2016 & 2017 & 2018 First-class Scholarship at China University of Petroleum (CUP)
- 2014 Schlumberger Engineering Fellowship (Top 8 university-wide)
- 2013 Chinese National Scholarship for Outstanding Merits (Top 0.2% nationwide)

### Honors and Awards

- 2020 First Runner-up in the 3rd JD.COM Discovery Cup Patent Competition (Top %0.1 company-wide)
- 2020 Silver Medal Award of Distinguished Technical Recruiter at JD.COM (Top %5 company-wide)
- 2020 Bronze Medal Award of Certified Technical Instructor at JD.COM
- 2019 Beijing Outstanding Graduate Award (Top %0.1 nationwide)
- 2015 & 2017 Meritorious Winner of American Mathematical Contest in Modeling (Top %5 worldwide)
- 2015 Dean's List for the Best Undergraduate Students at CUP (Top %1 university-wide)
- 2013 & 2015 Third Prizes of Chinese National Petroleum Engineering Design Competition (Top 5% nationwide)