

# Jinrui (Jerry) Gou

Computer Science and Engineering  
Tandon School of Engineering  
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<b>EDUCATION</b>	<b>New York University</b>	Brooklyn, NY
	Ph.D. in Computer Science	09/2021-Present
	Advisor: Professor Torsten Suel	
	Cumulative GPA: 3.97/4.0	
	M.S. in Computer Science	09/2019-05/2021
	Cumulative GPA: 4.0/4.0	
	<b>Sun Yat-Sen University</b>	Guangzhou, China
	B.E. in Computer Science & Technology	09/2015-06/2019
	Cumulative GPA: 90/100 (3.8/4.0)	
	Mathematics Courses GPA: 95/100	

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## KNOWLEDGE

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- **Languages:** C/C++, Python, SQL, AMPL/CPLEX, Latex, MATLAB, Bash, HTML5.
- **Tools:** Scikit-learn, PyTorch, TensorFlow, Numpy, Matplotlib, TBB, AVX/AVX2, CUDA.
- **Courses Enrolled:** Computer Architecture, Natural Language Processing, Machine Learning (Rank 1<sup>st</sup> in Class of 43 students), Deep Learning, Web Search Engines, Design & Analysis of Algorithms (Rank 1<sup>st</sup> in Class of 47 students), Network Design and Algorithms (Rank 2<sup>nd</sup> in Class of 20 students), Algorithmic Machine Learning and Data Science.

## RESEARCH EXPERIENCE

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*Ph.D. Research Assistant for Prof. Torsten Suel, NYU* 09/2021-Present

1. Effective Candidate Generation and Threshold Estimation for Fast Top-K Query Processing
  - Develop efficient and effective early termination algorithms for simple ranking functions.
  - Design specialized prefixes index structures and fine-tune its storage for efficient access.
  - Perform fast lookups using highly optimized index structures to improve the quality of results.
  - Implement efficient C++ code for experiments on different collections and ranking functions.
2. Graph Based Approximate Near-neighbor Search
  - Propose navigable graph that can preform greedy routing for nearest neighbor search.
  - Design efficient randomized algorithms to create effective sparse navigable graphs.
  - Bound the maximum degree and average degree of navigable graphs using mathematical proof.
  - Develop efficient search algorithms for navigable graphs in different benchmark graph datasets.

### 3. Sparse Learned Index Structures Optimization

- Expand documents by generating related questions, using LLM Llama 2.
- Use ELECTRA-based relevance model to improve document expansion quality.
- Train BERT-based language model to predict importance of terms in documents.
- Fuse the knowledge from cross-encoder to improve training, using hard negatives and distillation.

Graduate Research Assistant for Prof. Yong Liu, Networked Systems Lab, NYU

09/2019-05/2021

#### 1. Realtime Mobile Network Prediction for High QoS

- Collect mobile 4G/LTE bandwidth traces in metro area of NYC.
- Develop LSTM RNN models for high-accuracy realtime bandwidth prediction.
- Develop Gradient Boosting models for handoffs predictions between 4G and 5G access modes.

#### 2. Joint Traffic Routing and Computation Server Placement in Edge Cloud Networks

- Build quasi-convex optimization model to balance traffic and computation resource allocation.
- Use AMPL/CPLEX and Python optimization packages to obtain optimal feasible solutions.

## PUBLICATIONS

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1. **Jinrui Gou**, Antonio Mallia, Yifan Liu, Minghao Shao, and Torsten Suel, “Fast and Effective Early Termination for Simple Ranking Functions”, *ACM SIGIR Conference on Research and Development in Information Retrieval*, July 2025.
2. **Jinrui Gou**, Yifan Liu, Minghao Shao, and Torsten Suel, “Beyond Quantile Methods: Improved Top-K Threshold Estimation for Traditional and Learned Sparse Indexes”, *IEEE International Conference on Big Data*, December 2024.
3. Soyuj Basnet, **Jinrui Gou**, Antonio Mallia, and Torsten Suel, “DeeperImpact: Optimizing Sparse Learned Index Structures”, in *ReNeuIR at SIGIR 2024: The Third Workshop on Reaching Efficiency in Neural Information Retrieval*, July 2024.
4. Haya Diwan, **Jinrui Gou**, Cameron Musco, Christopher Musco, and Torsten Suel, “Navigable Graphs for High-Dimensional Nearest Neighbor Search: Constructions and Limits”, *NeurIPS 2024: Conference on Neural Information Processing Systems*, December 2024.
5. Lifan Mei, **Jinrui Gou**, Jingrui Yang, Yujin Cai, and Yong Liu, “On Routing Optimization in Networks with Embedded Computational Services”, *IEEE Transactions on Network and Service Management*, September 2024.
6. Lifan Mei, **Jinrui Gou**, Yujin Cai, Houwei Cao, and Yong Liu, “Realtime mobile bandwidth and handoff predictions in 4G/5G networks”, *Computer Networks*, February 2022.

## EMPLOYMENT EXPERIENCE

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Teaching Assistant, ECE-GY 9343 Data Structures and Algorithms, NYU

Spring, Summer, Fall 2020

- Create homework questions, and grade homework submissions and exams.
- Help the professor answer students’ questions on Piazza, and hold online TA office hours.