

# Cong Zhang

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## EDUCATION

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| <b>Nanyang Technological University (NTU)</b><br><i>Ph.D. in Computer Science; CGPA: 4.00/5.00</i>                                         | Singapore<br>Aug 2018 – Aug 2022      |
| <b>Imperial College London (ICL)</b><br><i>Master of Science with Merit in Computer Science; Merit.</i>                                    | London, UK<br>Oct 2015 – Nov 2016     |
| <b>University of Liverpool (UoL)</b><br><i>Bachelor of Science with Honours in Mathematics; First Class Honours.</i>                       | Liverpool, UK<br>Sep 2011 – July 2015 |
| <b>Xi'an Jiaotong-Liverpool University (XJTLU)</b><br><i>Bachelor of Science with Honours in Applied Mathematics; First Class Honours.</i> | Suzhou, China<br>Sep 2011 – July 2015 |

## RESEARCH INTERESTS

During my PhD, my research mainly lies in the intersection of Artificial Intelligence and Operations Research. I am particularly interested in leveraging Deep Reinforcement Learning (**DRL**) to solve challenging combinatorial optimization problems (**COP**) in various application domains, such as job-shop scheduling and vehicle routing. Now, my research focus is on reinforcement learning from human feedback (**RLHF**) and large language model-powered intelligent agents (**LLM-Agent**).

## WORKING EXPERIENCE (I AM CURRENTLY A SINGAPORE PERMANENT RESIDENT (**PR**).)

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| <b>LLM Algorithm Research Scientist, TikTok @ Singapore</b><br>Long Chain-of-Thought (CoT) Reasoning; Reinforcement Fine-tuning.                                     | Aug 2024 – Present  |
| <b>AI Research Engineer, Huawei International Pte Ltd @ Singapore</b><br>Reinforcement Learning From Human Feedback (RLHF); Agent Pipeline Building; Agent Planning. | Nov 2022 – Aug 2024 |

## HONOURS AND AWARDS

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|-------------------------------------------------------------|-----------|
| <b>Singapore International Graduate Award (SINGA)   NTU</b> | 2018-2022 |
| <b>Excellent Undergraduate Award   XJTLU</b>                | 2013-2015 |
| <b>The Second Class Entry Scholarship   XJTLU</b>           | 2011      |
| <b>Certificate for Teaching Assistant   NTU</b>             | 2019      |

## RESEARCH EXPERIENCE

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| <b>Research Assistant @ SIMTech A*STAR</b>   Advisors: Dr. Tan Puay Siew & Dr. Xu Chi<br>Cyber-Physical System; Smart Manufacturing; Manufacturing Scheduling. | 2019 – 2022 |
| <b>Research Assistant @ The Hong Kong Polytechnic University</b>   Advisor: Dr.Chung Fu Lai                                                                    | 2017 – 2018 |

## TEACHING EXPERIENCE

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| <b>CS2002 Object Oriented Design and Programming - Labs @ NTU</b><br><i>Course advisor: Prof. Zhang Jie</i> | Aug 2022 |
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## SKILLS

**Programming Languages:** Python, C/C++, Java, HTML, CSS  
**Frameworks & Tools:** Pytorch, Hugging Face Transformers, Pytorch-Geometric (PyG), Docker, Git, LaTeX, VeRL  
**Soft Skill:** Proficient English Writing and Presentation Skills, Team-working Skill

## PUBLICATIONS

(\* means equal contribution. † means the corresponding author. I have **676** citations so far ([Google Scholar](#)).)

- Cong Zhang\***, Wen Song\*, Zhiguang Cao, Jie Zhang, Puay Siew Tan, and Xu Chi. Learning to dispatch for job shop scheduling via deep reinforcement learning. In *Advances in Neural Information Processing Systems*, volume 33, pages 1621–1632. Curran Associates, Inc., 2020. ([NeurIPS-2020](#), [DRL4COP](#))

- 2 **Cong Zhang**, Zhiguang Cao, Wen Song, Yaoxin Wu, and Jie Zhang. Deep reinforcement learning guided improvement heuristic for job shop scheduling. In *The Twelfth International Conference on Learning Representations*, 2024. ([ICLR-2024](#), [DRL4COP](#))
- 3 **Cong Zhang**, Zhiguang Cao, Yaoxin Wu, Wen Song, and Jing Sun. Learning topological representations with bidirectional graph attention network for solving job shop scheduling problem. In *The Fortieth Conference on Uncertainty in Artificial Intelligence*, 2024. ([UAI-2024](#), [DRL4COP](#))
- 4 **Cong Zhang\***, Yaoxin Wu\*, Yining Ma\*, Wen Song, Zhang Le, Zhiguang Cao, and Jie Zhang. A review on learning to solve combinatorial optimisation problems in manufacturing. *IET Collaborative Intelligent Manufacturing*, 5(1):e12072, 2023. ([IETCIM-2023](#), [Invited paper](#), [DRL4COP](#))
- 5 **Cong Zhang\***, Deik Derrick Goh Xin\*, Dexun Li, Hao Zhang, and Yong Liu. Planning with multi-constraints via collaborative language agents. pages 10054–10082, January 2025. ([COLING](#), [LLM-Agent](#))
- 6 Dexun Li\*, **Cong Zhang\***<sup>†</sup>, Kuicai Dong, Derrick Goh Xin Deik, Ruiming Tang, and Yong Liu. Aligning crowd feedback via distributional preference reward modeling. *ICML MFHAIA Workshop*, 2024. ([ICML Workshop](#), [RLHF](#))
- 7 Rongkai Zhang\*, **Cong Zhang\***, Zhiguang Cao, Wen Song, Puay Siew Tan, Jie Zhang, Bihan Wen, and Justin Dauwels. Learning to solve multiple-tsp with time window and rejections via deep reinforcement learning. *IEEE Transactions on Intelligent Transportation Systems*, 24(1):1325–1336, 2022. ([TITS-2023](#), [IF:8.5](#), [DRL4COP](#))
- 8 Chupeng Su\*, **Cong Zhang\***, Chuang Wang, Weihong Cen, Gang Chen, and Longhan Xie. Graph-based reinforcement learning for multi-objective flexible job shop scheduling problem. *Swarm and Evolutionary Computation*, 2024. ([SWEVO-2024](#), [DRL4COP](#))
- 9 Yifan Yang, Gang Chen, Hui Ma, **Cong Zhang**<sup>†</sup>, Zhiguang Cao, and Mengjie Zhang. Graph assisted offline-online deep reinforcement learning for dynamic workflow scheduling. *Swarm and Evolutionary Computation*, 2025. ([ICLR-2025](#), [DRL4COP](#))
- 10 Wenhui Huang, **Cong Zhang**, Jingda Wu, Xiangkun He, Jie Zhang, and Chen Lv. Sampling efficient deep reinforcement learning through preference-guided stochastic exploration. *IEEE Transactions on Neural Networks and Learning Systems*, 2023. ([TNNLS-2023](#), [IF:10.4](#), [DRL](#))
- 11 Jing Sun, Shuo Chen, **Cong Zhang**, Yining Ma, and Jie Zhang. Decision-making with speculative opponent models. *IEEE Transactions on Neural Networks and Learning Systems*, 2024. ([TNNLS-2024](#), [IF:10.4](#), [DRL](#))
- 12 Chupeng Su, **Cong Zhang**, Dan Xia, Baoan Han, Chuang Wang, Gang Chen, and Longhan Xie. Evolution strategies-based optimized graph reinforcement learning for solving dynamic job shop scheduling problem. *Applied Soft Computing*, 145:110596, 2023. ([ASC-2023](#), [IF:8.7](#), [DRL4COP](#))
- 13 Wenjun Li, Dexun Li, Kuicai Dong, **Cong Zhang**, Hao Zhang, Weiwen Liu, Yasheng Wang, Ruiming Tang, and Yong Liu. Adaptive tool use in large language models with meta-cognition trigger. *arXiv preprint arXiv:2405.18727*, 2025. ([ACL-2025](#), [LLM-Agent](#))
- 14 Huanshuo Liu, Hao Zhang, Zhijiang Guo, Kuicai Dong, Xiangyang Li, Yi Quan Lee, **Cong Zhang**, and Yong Liu. Ctrlra: Adaptive retrieval-augmented generation via probe-guided control. *arXiv preprint arXiv:2405.18727*, 2025. ([ACL-2025](#), [RAG](#))
- 15 Kuicai Dong, Derrick Goh Xin Deik, Yi Quan Lee, Hao Zhang, Xiangyang Li, **Cong Zhang**, and Yong Liu. MC-indexing: Effective long document retrieval via multi-view content-aware indexing. In Yaser Al-Onaizan, Mohit Bansal, and Yun-Nung Chen, editors, *Findings of the Association for Computational Linguistics: EMNLP 2024*, pages 2673–2691, Miami, Florida, USA, November 2024. ([EMNLP-2024](#), [RAG](#)). Association for Computational Linguistics
- 16 Igor G. Smit, Jianan Zhou, Robbert Reijnen, Yaoxin Wu, Jian Chen, **Cong Zhang**, Zaharah Bukhsh, Yingqian Zhang, and Wim Nuijten. Graph neural networks for job shop scheduling problems: A survey. *Computers & Operations Research*, 176:106914, 2025. ([COR](#), [DRL4COP](#))