# TAOAN HUANG

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## EDUCATION

**University of Southern California** — Los Angeles, CA, USA
Ph.D. student in Computer Science — Aug 2019 - Aug 2024 (expected)

- Overall GPA: 4/4
- Recipient of a USC Annenberg Graduate Fellowship

**Tsinghua University** — Beijing, China
B.Eng. in Computer Science — Sep 2015 - Jul 2019

- Overall GPA: 3.6/4, Institute for Interdisciplinary Information Sciences
- Selected to Yao Class (a special pilot computer science class, directed by Professor Andrew Yao)

## EXPERIENCE

**Meta AI Research, FAIR Labs** — Menlo Park, CA, USA
Research scientist intern mentored by Benoit Steiner and Dr. Yuandong Tian — May 2022 - Dec 2022

- Developed CL-LNS, an ML-guided framework for solving Integer Linear Programs. Outperformed state-of-the-art methods on multiple combinatorial optimization problems.
- Used machine learning to learn surrogate objectives for non-linear combinatorial optimization problems. Outperformed Meta's existing methods in recommendation systems and inverse photonic design.

**Amazon Robotics** — Remote, USA
Research scientist intern mentored by Dr. Vikas Shivashankar — May 2021 - Aug 2021

- Developed ROSETTA, a local search algorithm for multi-goal multi-agent path planning in congested warehouse environments. It solves large-scale warehouse problems and is 28% more effective than the current system.

**University of Southern California** — Los Angeles, USA
Research assistant mentored by Prof. Sven Koenig and Prof. Bistra Dilkina — Aug 2019 - Present

- Developed a series of state-of-the-art ML-guided search algorithms for Multi-Agent Path Finding.
- Developed a software for building seismic resilience water pipe networks tested on multiple water zones in the City of Los Angeles.

**Carnegie Mellon University** — Pittsburgh, PA, USA
Research intern mentored by Prof. Fei Fang — Feb 2018 - Jul 2018

- Developed a novel dynamic programming-based algorithm to dispatch pre-scheduled and on-demand requests in ride-share systems.
- Developed a game-theoretic framework to compute patrol strategies against poachers with the presence of community members for wildlife conservation.

## RESEARCH FOCUS

My research focus lies in artificial intelligence, with particular attention to: machine learning, combinatorial optimization, multi-agent system, computational game theory and computational sustainability.

## SELECTED HONORS

- Best Student Paper Runner-Up, ICAPS, 2023
- Outstanding Paper Award, ICML SODS Workshop, 2023
- Annenberg Graduate Fellowship, University of Southern California, 2019-2023
- Xuetang Program Fellowship, Tsinghua University, 2015-2019.
- Freshman Scholarship, Tsinghua University, 2015.
- Gold Medal (top 50 contestants, Team China candidate for IOI 2015), National Olympiad in Informatics, 2014.
- Gold Medal (top 25 contestants in China), Asia-Pacific Informatics Olympiad, 2014.

## PUBLICATIONS

1. **Taoan Huang**, Aaron Ferber, Arman Zharmagambetov, Yuandong Tian and Bistra Dilkina. **Contrastive Predict-and-Search for Mixed Integer Linear Programs.** In submission to ICLR-24.

2. Aaron Ferber, Arman Zharmagambetov, **Taoan Huang**, Bistra Dilkina and Yuandong Tian. **GenCO: Generating Diverse Solutions to Nonlinear Combinatorial Optimization Problems.** In submission to ICLR-24.
3. Arman Zharmagambetov, Brandon Amos, Aaron Ferber, **Taoan Huang**, Bistra Dilkina and Yuandong Tian. **Landscape Surrogate: Learning Decision Losses for Mathematical Optimization Under Partial Information.** In Proceedings of NeurIPS-23 (in print).
4. Shuwei Wang, Vadim Bulitko, **Taoan Huang**, Sven Koenig and Roni Stern. **Synthesizing Priority Planning Formulae for Multi-Agent Pathfinding.** In Proceedings of AIIDE-23 (in print).
5. **Taoan Huang**, Aaron Ferber, Yuandong Tian, Bistra Dilkina, Benoit Steiner. **Searching Large Neighborhoods for Integer Linear Programs with Contrastive Learning.** In Proceedings of ICML-23.
6. Aaron Ferber, **Taoan Huang**, Daochen Zha, Martin Schubert, Benoit Steiner, Bistra Dilkina, Yuandong Tian. **SurCo: Learning Linear Surrogates For Combinatorial Nonlinear Optimization Problems.** In Proceedings of ICML-23. Outstanding Paper Award at the ICML-23 SODS Workshop.
7. **Taoan Huang**, Vikas Shivashankar, Michael Caldara, Joseph Durham, Jiaoyang Li, Bistra Dilkina, Sven Koenig. **Deadline-Aware Multi-Agent Tour Planning.** In Proceedings of ICAPS-23. Best Student Paper Runner-Up.
8. **Taoan Huang**, Aaron Ferber, Yuandong Tian, Bistra Dilkina, Benoit Steiner. **Local Branching Relaxation Heuristics for Integer Linear Programs.** In Proceedings of CPAIOR-23.
9. Shuyang Zhang, Jiaoyang Li, **Taoan Huang**, Sven Koenig, Bistra Dilkina. **Learning a Priority Ordering for Prioritized Planning in Multi-Agent Path Finding.** In Proceedings of the Symposium on Combinatorial Search 2022.
10. Sumedh Pendurkar, **Taoan Huang**, Sven Koenig and Guni Sharon. **A Discussion on the Scalability of Heuristic Approximators.** In Proceedings of the Symposium on Combinatorial Search 2022 (Extended Abstract).
11. **Taoan Huang**, Jiaoyang Li, Bistra Dilkina, Sven Koenig. **Anytime Multi-Agent Path Finding via Machine Learning-Guided Large Neighborhood Search.** In Proceedings of AAAI-22.
12. **Taoan Huang**, Bistra Dilkina, Sven Koenig. **Learning to Select Nodes for Bounded-Suboptimal Conflict-Based Search for Multi-Agent Path Finding.** In Proceedings of AAMAS-21.
13. **Taoan Huang**, Bistra Dilkina, Sven Koenig. **Learning to Resolve Conflicts for Multi-Agent Path Finding with Conflict-Based Search.** In Proceedings of AAAI-21.
14. **Taoan Huang**, Bistra Dilkina. **Enhancing Seismic Resilience of Water Pipe Networks.** In Proceedings of COMPASS-20.
15. Weiran Shen, Weizhe Chen, **Taoan Huang**, Rohit Singh, Fei Fang. **When to Follow the Tip: Security Games with Strategic Informants.** In Proceedings of IJCAI-20.
16. **Taoan Huang**, Weiran Shen, David Zeng, Tianyu Gu, Rohit Singh, Fei Fang. **Green Security Game with Community Engagement.** In Proceedings of AAMAS-20.
17. **Taoan Huang**, Bohui Fang, Xiaohui Bei, Fei Fang. **Dynamic Trip-Vehicle Dispatch with Scheduled and On-Demand Requests.** In Proceedings of UAI-19.
18. **Taoan Huang**, Bohui Fang, Hoon Oh, Xiaohui Bei, Fei Fang. **Optimal Trip-Vehicle Dispatch with Multi-Type Requests**. In Proceedings of AAMAS-19 (Extended Abstract).

## ADDITIONAL INFORMATION

**Services**

- Reviewer for ICLR (2024), NeurIPS (2023), ICML (2023), AAAI (2021, 2022, 2023, 2024), AIES (2022), SoCS (2021, 2022), EAAMO (2022), AIIDE (2023), CPAIOR (2023), JINT.

**Teaching Experiences**

- Olympiad in Informatics, Invited Lecturer (2012-2018): Invited to give lectures on algorithms and programming to high school students, which ranged from 50 to 80 attendees each year

**Programming Skills**

- Languages: C++, Python, Pascal, Java, C
- Software: Gurobi, PyTorch, LaTeX, QGIS, SCIP.
- Awards: Gold medalist (top 50 contestants) in China National Olympiad in Informatics 2014; Gold medalist (top 25 contestants) in Asia-Pacific Informatics Olympiad 2014 (China Region)