

# TAOAN HUANG

+1(213)507-3239  $\diamond$  taoanhua@usc.edu

## EDUCATION

---

**University of Southern California**

Ph.D. student in Computer Science

Los Angeles, USA

Aug 2019 - Present

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

**Tsinghua University**

B.Eng. in Computer Science

Beijing, China

Sep 2015 - Jul 2019

- Overall GPA: 3.6/4, Institute for Interdisciplinary Information Sciences
- Selected to the Tsinghua Xuetang Yao Class (a special pilot computer science class, directed by Professor Andrew Yao)
- 2015-2018 Tsinghua Xuetang Program Fellowship
- Research intern at the University of Hong Kong from Jul 2018 to Aug 2018 (hosted by Professor Zhiyi Huang), and Carnegie Mellon University from Feb 2018 to Jul 2018 (hosted by Professor Fei Fang)

## RESEARCH INTEREST

---

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

## PUBLICATIONS

---

1. **Taoan Huang**, Jiaoyang Li, Bistra Dilkina, Sven Koenig. **Anytime Multi-Agent Path Finding via Machine Learning-Guided Large Neighborhood Search**. Working paper.
2. **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 (To appear).
3. **Taoan Huang**, Bistra Dilkina, Sven Koenig. **Learning to Resolve Conflicts for Multi-Agent Path Finding with Conflict-Based Search**. In Proceedings of AAI-21 (To appear).
4. **Taoan Huang**, Bistra Dilkina: **Enhancing Seismic Resilience of Water Pipe Networks**. In Proceedings of COMPASS-20.
5. 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.
6. **Taoan Huang**, Weiran Shen, David Zeng, Tianyu Gu, Rohit Singh, Fei Fang. **Green Security Game with Community Engagement**. In Proceedings of AAMAS-20.
7. **Taoan Huang**, Bohui Fang, Xiaohui Bei, Fei Fang. **Dynamic Trip-Vehicle Dispatch with Scheduled and On-Demand Requests**. In Proceedings of UAI-19
8. **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).

## RESEARCH EXPERIENCE

---

### University of Southern California

Mentee to Professor Sven Koenig and Professor Bistra Dilkina

Los Angeles, USA

Mar 2020 - Present

#### Machine Learning-Guided Search for Multi-Agent Path Finding

- Applied machine learning to learn to resolve conflicts in Conflict-Based Search (CBS). Our approach outperforms the state-of-the-art optimal solver on multiple benchmark datasets. A paper published in AAAI-21.
- Applied imitation learning and curriculum learning to learn to select search tree nodes in bounded suboptimal CBS. Our approach outperforms the state-of-the-art bounded suboptimal solver on multiple benchmark datasets. A paper published in AAMAS-21.
- Applied machine learning to an anytime solver based on Large Neighborhood Search. A paper submitted to SoCS-21.

### University of Southern California

Mentee to Professor Bistra Dilkina

Los Angeles, USA

Sep 2019 - Present

#### Enhancing Seismic Resilience of Water Pipe Networks

- Modeled the problem of building a system-wide seismic resilience network as a network design problem.
- Provided an efficient mixed-integer program to find the optimal solution and a dynamic programming-based sequential planning algorithm to plan network installments.
- Demonstrated the effectiveness of our approaches through a case study on a water service zone in Los Angeles.

### Carnegie Mellon University

Mentee to Professor Fei Fang

Pittsburgh, USA

Apr 2018 - Jun 2019

#### Green Security Game with Community Engagement

- Provided the first study in security games which took community engagement into account
- Proposed a novel two-stage game model
- Provided complexity results, and developed exact, approximate, and heuristic algorithms for finding the equilibria
- The algorithms and analysis from this study provides useful insights and guidance for law enforcement agencies wanting to allocate their budget towards recruiting informants, in order to protect wildlife

### Carnegie Mellon University

Mentee to Professor Fei Fang and Professor Xiaohui Bei

Pittsburgh, USA

Apr 2018 - Sep 2018

#### Dynamic Trip-Vehicle Dispatch with Scheduled and On-Demand Requests

- Introduced a novel two-stage model for the dynamic trip-vehicle dispatch problem, by taking into account both scheduled and on-demand requests
- Proposed algorithms for both stages, that took into account demand distributions and came with theoretical guarantees
- Demonstrated the effectiveness of the algorithms through extensive experiments

### University of Hong Kong

Mentee to Professor Zhiyi Huang

Hong Kong, China

Jul 2018 - Aug 2018

#### Online Algorithms in Real-World Task Assignments

- Derived an optimal deterministic online algorithm, for a general case in the pre-scheduled trip booking problem
- Derived 3-competitive online algorithms, for two cases in the on-demand food delivery problem

**Carnegie Mellon University**

Mentee to Professor Fei Fang

Pittsburgh, USA

Mar 2018 - Apr 2018

**Multi-Model Ridesharing**

- Studied the multi-model ridesharing problem, where scheduled and on-demand requests were put into consideration
- Provided complexity results for different settings
- Developed an exact algorithm, as well as several heuristic approaches

## **ADDITIONAL INFORMATION**

---

### **Additional Extracurricular 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

### **Programming Skills**

- Languages: C, C++, Python, and Pascal
- Software: Gurobi, PyTorch, LaTeX, QGIS.
- 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)