

# CHEN TANG

<https://chentangmark.github.io>

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## EDUCATION

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### University of California Berkeley

PhD Candidate in Mechanical Engineering (Control)

*Minors: Machine learning, Optimization*

*Advisor: Prof. Masayoshi Tomizuka*

*August 2016 - June 2022 (Expected)*

GPA: 3.941/4.0

### Hong Kong University of Science and Technology

BEng in Mechanical Engineering

*Minor: Mathematics*

*August 2012 - June 2016*

GPA: 3.951/4.3

### Georgia Institute of Technology

Exchange Student in Mechanical Engineering

*August 2014 - December 2014*

GPA: 4.0/4.0

## RESEARCH INTEREST

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The goal of my research is to develop trustworthy and safe intelligent autonomous systems interacting with humans (e.g., autonomous vehicles). In particular, I am interested in improving the transparency and robustness of learning-based autonomous systems, by incorporating domain knowledge and other techniques (e.g., model-based control, explainable AI) with deep learning models in a principled manner. Applications of my research include multi-agent trajectory prediction, interaction modeling, motion planning, and vehicle control.

## WORK EXPERIENCE

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### Waymo Behavior Team

*Intern, Planner Prediction Router ML & Deep Learning (Host: Qiaojing Yan, Stephane Ross)*

- Build a fast conditional prediction model with deep learning based on Multipath, which achieves the same prediction quality as the full model but significantly reduces inference time.

*May 2021 - August 2021*

### Honda Research Institute US

*Student Research Intern (Mentor: Sujitha Martin)*

- Propose an explainable relational inference framework combining IRL and neural relational inference to incorporate domain knowledge into deep learning models in a principled manner, which enables semantically meaningful explanation of vehicle interaction in terms of their relations.

*June 2019 - Dec 2019*

## TEACHING EXPERIENCE

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### Department of Mechanical Engineering, UC Berkeley

*Graduate Student Instructor - ME 233 Advanced Control System II*

- Instructor: Prof. Masayoshi Tomizuka

- Rating: 4.50, Department Average: 4.15

*Jan 2020 - May 2020*

## PUBLICATIONS

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### Journal

1. **C. Tang\***, Z. Xu\*, and M. Tomizuka, "Disturbance-observer-based tracking controller for neural network driving policy transfer," *IEEE Transactions on Intelligent Transportation Systems*, vol. 21, no. 9, pp. 3961–3972, 2019

2. Á. Cuenca, W. Zhan, J. Salt, J. Alcaina, **C. Tang**, and M. Tomizuka, “A remote control strategy for an autonomous vehicle with slow sensor using kalman filtering and dual-rate control,” *Sensors*, vol. 19, no. 13, p. 2983, 2019
3. X. Liu, **C. Tang**, X. Du, S. Xiong, S. Xi, Y. Liu, X. Shen, Q. Zheng, Z. Wang, Y. Wu, *et al.*, “A highly sensitive graphene woven fabric strain sensor for wearable wireless musical instruments,” *Materials Horizons*, vol. 4, no. 3, pp. 477–486, 2017

### Conference Proceedings

1. **C. Tang**, W. Zhan, and M. Tomizuka, “Exploring social posterior collapse in variational autoencoder for interaction modeling,” *Conference on Neural Information Processing Systems (NeurIPS)*, 2021
2. J. Li, **C. Tang**, M. Tomizuka, and W. Zhan, “Dealing with the unknown: Pessimistic offline reinforcement learning,” in *5th Annual Conference on Robot Learning (CoRL)*, 2021
3. J. M. S. Ducaju, **C. Tang**, and M. Tomizuka, “Application specific system identification for model-based control in self-driving cars,” in *2020 IEEE Intelligent Vehicles Symposium (IV)*, IEEE, 2020
4. **C. Tang**, J. Chen, and M. Tomizuka, “Adaptive probabilistic vehicle trajectory prediction through physically feasible bayesian recurrent neural network,” in *2019 International Conference on Robotics and Automation (ICRA)*, pp. 3846–3852, IEEE, 2019
5. Z. Xu, H. Chang, **C. Tang**, C. Liu, and M. Tomizuka, “Toward modularization of neural network autonomous driving policy using parallel attribute networks,” in *2019 IEEE Intelligent Vehicles Symposium (IV)*, pp. 1400–1407, IEEE, 2019
6. Z. Xu\*, **C. Tang\***, and M. Tomizuka, “Zero-shot deep reinforcement learning driving policy transfer for autonomous vehicles based on robust control,” in *2018 21st International Conference on Intelligent Transportation Systems (ITSC)*, pp. 2865–2871, IEEE, 2018
7. J. Chen, **C. Tang**, L. Xin, S. E. Li, and M. Tomizuka, “Continuous decision making for on-road autonomous driving under uncertain and interactive environments,” in *2018 IEEE Intelligent Vehicles Symposium (IV)*, pp. 1651–1658, IEEE, 2018
8. C. Zhao, R. Xu, K. Song, D. Liu, S. Ma, **Chen. Tang**, C. Liang, Y. Zohar, and Y.-K. Lee, “The capillary number effect on the capture efficiency of cancer cells on composite microfluidic filtration chips,” in *2015 28th IEEE International Conference on Micro Electro Mechanical Systems (MEMS)*, pp. 459–462, IEEE, 2015

### Workshop

1. **C. Tang**, N. Srishankar, S. Martin, and M. Tomizuka, “Explainable autonomous driving with grounded relational inference,” in *NeurIPS Workshop on Machine Learning for Autonomous Driving*, 2020

### Working Papers

1. **C. Tang**, W. Zhan, and M. Tomizuka, “Interventional behavior prediction: Avoiding overly confident anticipation in interactive prediction,” *2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, under review
2. L. Sun\*, **C. Tang\***, Y. Niu, E. Sachdeva, C. Choi, T. Misu, M. Tomizuka, and W. Zhan, “Domain knowledge driven pseudo labels for interpretable goal-conditioned interactive trajectory prediction,” *IEEE Robotics and Automation Letters (RA-L)*, under review
3. J. Li, **C. Tang**, W. Zhan, and M. Tomizuka, “Hierarchical planning through goal-conditioned offline reinforcement learning,” *IEEE Robotics and Automation Letters (RA-L)*, under review

4. **C. Tang**, N. Srishankar, S. Martin, and M. Tomizuka, “Grounded relational inference: Domain knowledge-driven explainable autonomous driving,” *IEEE Transactions on Robotics (T-RO)*, under review
5. J. Chen, **C. Tang**, W. Zhan, and M. Tomizuka, “Interaction-and-uncertainty-aware joint decision making and trajectory planning for urban on-road autonomous driving,” in preparation for journal submission

*(The superscript \* indicates equal contribution.)*

## INVITED TALKS

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### **Exploring Social Posterior Collapse in Variational Autoencoder for Interaction Modeling**

- ASL Lab Seminar at Stanford University
- ICL Lab Seminar at Carnegie Mellon University
- AI TIME PhD Talk at Tsinghua University

### **Zero-shot Deep Reinforcement Learning Driving Policy Transfer for Autonomous Vehicles based on Robust Control**

- Workshop on Reinforcement Learning for Transportation at ITSC 2018

## AWARDS AND SCHOLARSHIPS

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Graduate Division Block Grant Summer 2020  
IEEE ITSC 2018 Best Student Paper Runner-up  
HKUST Academic Achievement Medal (top 1%)  
HKUST President’s Cup Silver Award (2016)  
ROBOCON Hong Kong Contest First Runner-up (2013, 2014)  
ABU ROBOCON Final Eight, Best Engineering Award (2013)

## ACADEMIC SERVICES

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### **Reviewers**

- IEEE Transaction on Intelligent Transportation Systems
- IEEE International Conference on Robotics and Automation
- IEEE Intelligent Vehicles Symposium
- IEEE International Conference on Control, Automation, Robotics and Vision
- American Control Conference

### **Program Committee**

- Co-organizer of Workshop at IEEE Conference on Robotics and Systems (IROS), 2021
- Associate Editor at IEEE Intelligent Transportation Systems Conference (ITSC), 2021
- Associate Editor at IEEE Intelligent Transportation Systems Conference (ITSC), 2022

## MENTORSHIP

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### **Undergraduate Students**

- Lu Wen (now PhD student at University of Michigan)
- Tianchen Ji (now PhD student at University of Illinois at Urbana-Champaign)
- Chen Liu (now PhD student at University of Cambridge)
- Yiping Dong (now Master student at Carnegie Mellon University)
- Chenran Li (now PhD student at UC Berkeley)
- Bhavesh Kalisetti (undergraduate student at UC Berkeley)
- Vade Shah (undergraduate student at UC Berkeley)

### **Master Students**

- Junzhe Shi (now software engineer at Apple)

- Julin Salt Ducaju (now PhD student at Lund University)
- Eric Bergkvist (visiting scholar at UC Berkeley)
- Yaru Niu (incoming PhD student at Carnegie Mellon University)

**PhD Students**

- Ce Hao (PhD student at UC Berkeley)
- Catherine Weaver (PhD student at UC Berkeley)
- Jinning Li (PhD student at UC Berkeley)
- Chenfeng Xu (PhD student at UC Berkeley)