Qianqian Tong

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Education

University of Texas at Austin — Austin, TX
Ph.D. in Transportation Engineering — *08/2023-now*

- Research interests: intermodal terminal modeling, machine learning, traffic assignment

Shanghai University of Engineering Science — Shanghai, China
B.E. in Transportation — *09/2019-07/2023*

- GPA: 4.0/4.0, ranked 1/407, outstanding undergraduate student

Research and Projects

INFORMES: INtermodal Freight Optimization for a Resilient Mobility Energy System *01/2024-now*
PI: Kyungsoo Jeong, Advisor: C. Tyler Dick, Sponsor: APAR-E, Project lead: NREL

- Quantify the node performance functions from SimPy-based LIFTS simulation project and optimize the resource allocation combinations in intermodal terminals considering time, cost, and emissions
- Contribute to ALTRIOS development in terminal simulation and conduct the mainline simulation based on topology & profile from the national-wide track chart data
- Integrate the infrastructure model of optimal resource allocations and the logistic model of container assignment

Dynamic Programming for Container Reshuffling Decision-making *02/2025-05/2025*
Cooperate with Kyle Bathgate, Matthew Friar

- Minimized reshuffling moves during container placement to enhance terminal operational efficiency
- Designed and implemented a rule-based heuristic algorithm, achieving over 90% improvement compared to naive stacking while maintaining short runtime

Train Timetable Rescheduling Optimization Model for Large-scale Railroad Networks *01/2023-06/2023*
Advisor: Prof. Zhigang Liu, Jufen Yang, Weijie Dai

- Established a model for passenger satisfaction to solve the complex train timetable rescheduling (TTR) problem
- Applied A2C based reinforcement learning frame to solve the TTR problem

Research on Track Crack Detection Model Based on YOLO Network *04/2020-05/2022*
Advisor: Prof. Shubin Zheng, Liming Li, Rail Transit Testing Technology Laboratory

- Extracted concrete sleeper regions from whole track images by gray projection algorithm with HALCON
- Developed a crack detection system to classify and segment cracks by improved YOLOv3 and BASNet
- Designed a detection interface by PyQt and schemed a camera carried railway inspection vehicle

Machine Learning Based Intelligent Tumour Subtarget Model Construction *07/2021-08/2022*
Advisor: Prof. Chunyan Duan, Institute of Industrial Engineering, Tongji University

- Proposed an integrated machine learning model to identify lung cancer risk regions and predict tumour variations
- Constructed a two-stage model by Self Organizing Map(clustering), automated machine learning(prediction), and SHARP(interpretation) with Python
- Improved our model performance and reduced computation costs by Meta-learning and Bayesian optimizer

Collaborative Optimization Model for Airport Transportation Dispatching Decision *09/2020-12/2021*
Advisor: Prof. Xiaobing Ding, Zhigang Liu, School of Urban Rail Transportation

- Established a multiple decision-making model for drivers at the airport or in urban areas
- Provided the more efficient passenger-carrying order and taxis channel layout with M/M/S queuing theory
- Customized an efficiency and income-balanced scheme for administrators of Shanghai Hongqiao Airport

Publications and Patents

Conference & Publications

1. **Tong, Q.**, and C.T. Dick. Container Terminal Resource and Performance Comparison of Self-Propelled Autonomous Railcars and Conventional Intermodal Trains. Transportation Research Record: Journal of the Transportation Research Board, 2025 (under revision).
2. **Tong, Q.**, and C.T. Dick. Optimal layout planning method for rail-road intermodal container terminals. In: Proceedings of the International Association of Railway Operations Research (IAROR) 11th International Conference on Railway Operations Modelling and Analysis, Dresden, Germany, April 2025.
3. **Tong, Q.**, Duan, C., Liu, Q., et al. TDAP: the Two-stage-clustering Diagnosis and Automated-machine-learning Prognosis model for precise lung cancer clinical treatments, *AAPM: The American Association of Physicists in Medicine*, 2023.
4. Liu, Q., **Tong, Q.**, Duan, C., et al. Voxelwise Two-Stage-Clustering and Machine-Learning Model for Robust Lung Cancer Tumor High-Risk Subregion Segmentation on FDG PET, *AAPM: The American Association of Physicists in Medicine*, 2023.

5. Liming Li, Shubin Zheng, Chenxi Wang, **Qianqian Tong**, and Ji Wang. Crack detection method of sleeper based on cascade convolution neural network, *Journal of Advanced Transportation*, 2022.
6. Wang Chenxi, Li liming, Zheng Shubin, and **Qianqian Tong**. Research on sleeper crack identification method based on cascade convolutional neural network. *Journal of Railway Science and Engineering*, 2021.

Patents

1. "Multi-target detection software for motorway", *National Copyright Administration*, 2022.
2. "A Zig-Bee based beacon system for simulated rail traffic", *National Intellectual Property Administration*, 2022.
3. "The utility model relates to an image capture device for inner wall of rail transit tunnel", *National Intellectual Property Administration*, 2021.

Reviewer Experience

Transportation Research Board, Transportmetrica B: Transport Dynamics, Journal of Rail Transport Planning & Management, Scientific Reports

Activities and Internships

ByteDance, Algorithm Intern *05/2023-07/2023*
Ping An Technology, Algorithm Intern *01/2023-03/2023*
Shanghai Shentong Metro Ltd, Yard Command Intern *11/2022-01/2023*
Chinese Calligraphy Association (Main Campus), President *09/2021-10/2021*
Shanghai Shentong Metro Ltd, Operations Management Intern *06/2021-07/2021*
Mathematical Modeling Club (Main Campus), Invited Lecturer *03/2021-04/2021*

Awards and Scholarships

Mathematical Contest in Modeling (United States)
Honorable Mention *05/2022*
Interdisciplinary Contest in Modeling (United States)
Honorable Mention *04/2021*
the 2021 Asia-Pacific Economic Cooperation (APEC) Innovation in Public Transport Competition
Third Prize *06/2021*
"Shenzhen Cup" Mathematical Modeling Challenge
Third Prize (national ranked top 1%) *11/2021*
National Mathematical Contest in Modeling
Second Prize *12/2020*
Shanghai Innovation Award
Excellent Innovation Reports (the highest award) *10/2021*
the 14^{th} Shanghai Computer Contest in Application
Second Prize *03/2022*
Outstanding Representatives of National Scholarship
The national selected ratio was less than 0.1% *2022*
First-class Excellent Student Scholarship *2020, 2021, 2022, 2023*
National Scholarship *2021, 2022*
Shanghai Scholarship *2020*
The University of Texas at Austin Fellowship *2023, 2024*

Skills and Programming

Programming	Python, R, C, SQL, JavaScript
Softwares	Anylogic, Vissim, MicroStation
Skills	Reinforcement Learning, Computer Vision, Dynamic Programming, SimPy, CPLEX/Gurobi