

# Yilong Chen

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Research interests: 4D Scene Graph, Dynamic SLAM, Robotics Simulation, CG, CV



## Education Background

|                 |                                                                                                                               |                 |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------|-----------------|
| 2022/05-present | <b>Georgia Institute of Technology</b><br>Ph.D. student in Construction Engineering, minor in Robotics, <a href="#">RICAL</a> | Atlanta, USA    |
| 2022/05-2025/05 | <b>Georgia Institute of Technology</b><br>M.S. in Computational Science and Engineering, Computer Graphics                    | Atlanta, USA    |
| 2021/09-2025/12 | <b>The University of Texas at Austin</b><br>M.S. in Computer Science, Artificial Intelligence                                 | Austin, USA     |
| 2016/09-2018/08 | <b>The University of Tokyo</b><br>M.S. in Environmental Studies                                                               | Tokyo, Japan    |
| 2011/09-2016/07 | <b>Zhejiang University</b><br>B.Eng. in Civil Engineering                                                                     | Hangzhou, China |
| 2014/10-2015/08 | Hokkaido University                                                                                                           | Sapporo, Japan  |

## Publications

- [1] **Yilong Chen**, Yong K Cho, “T-ConSG: A LiDAR-Based Real-Time Temporal Construction Scene Graph for Unstructured and Dynamic Environments,” *Submitted to IEEE Robotics and Automation Letters*, 2027. **Under Review**
- [2] **Yilong Chen**, Yong K Cho, “Learning Social Path Corrections from Unlabeled Trajectories: A LiDAR-Based Sim-to-Real GNN Framework for Construction Robots,” *Submitted to Automation in Construction*, 2027. **Under Review**
- [3] **Yilong Chen**, Yong K Cho, “Enhancing Socially Aware Construction Robot Navigation through LiDAR-Camera Sensor Fusion and Dynamic Object Tracking,” *Journal of Computing in Civil Engineering*, 2027. **Accepted**
- [4] **Yilong Chen**, Yong K Cho, “Socially Aware Construction Robot Navigation with a GNN-Enhanced DWA Planner,” *2026 International Conference on Computing in Civil Engineering (i3CE)*, 2026. **Accepted**
- [5] **Yilong Chen**, Yu Du, Xiaoke Zhang, Yong K Cho, “An Observation Feature Study of Robot Imitation Learning for Autonomous Social Navigation on Construction Sites,” *Proceedings of the ASCE 2025 International Conference on Computing in Civil Engineering (i3CE)*, 2025.
- [6] **Yilong Chen**, YeSeul Kim, Yarovoi Andrew, Seongyong Kim, Yong K Cho, “Online Dynamic Object Detection on Construction Sites using SLAM and Occupancy Grids,” *Proceedings of the ASCE 2024 International Conference on Computing in Civil Engineering (i3CE)*, 2024. **Best Paper Award: 2nd Runner-Up**
- [7] **Yilong Chen**, Seongyong Kim, Yonghan Ahn, Yong K Cho, “A Framework of Reconstructing Piping Systems on Classimbalanced 3D Point Cloud Data from Construction Sites,” *ISARC. Proceedings of the International Symposium on Automation and Robotics in Construction*, 2023.
- [8] **Yilong Chen**, Tsuyoshi Seike, Yongsun Kim, Maito Shimura, “Study on Simple Methods to Improve Housing Insulation Performance,” *Summaries of Technical Papers of Annual Meeting of AIJ*, 2018.
- [9] Jinhee Yu, Monika Jayakumar, **Yilong Chen**, Yong Cho, Jingdao Chen, “Self-supervised Learning with LiDAR-Camera Fusion for Construction Site Traversability Estimation,” *Proceedings of the ASCE 2025 International Conference on Computing in Civil Engineering (i3CE)*, 2025.
- [10] Yeseul Kim, **Yilong Chen**, Matthew Gombolay, Yong K Cho, “Understanding the Effects of Humanlike Robot Motions on Unfocused Human-Robot Interaction,” *Advanced Engineering Informatics*, 2025.
- [11] YeSeul Kim, Seongyong Kim, **Yilong Chen**, HyunJin Yang, Seungwoo Kim, Sehoon Ha, Matthew Gombolay, Yonghan Ahn, Yong Kwon Cho, “Understanding human-robot proxemic norms in construction: How do humans navigate around robots?,” *Automation in Construction*, 2024.

- [12] YeSeul Kim, **Yilong Chen**, Seongyong Kim, Yong K Cho, “How Much Distance Should Robots Keep from Other Workers at Construction Jobsites?,” *Construction Research Congress 2024*, 2024.
- [13] Yilan Zhou, Qing Wu, Xingling Xu, Shuaizhong Wang, **Yilong Chen**, “To the Harmony of Architectural and Structural Design: Interview of Junya ISHIGAMI and Jun SATO Working in Cooperation,” *The Architect*, 2021.
- [14] Sheng Bao, **Yilong Chen**, Yibin Gu, Yangjie Lin, “A Primary Frame of Facility Management Based on BIM,” *City & House*, 2018.

## Work & Internship

- 2022/08- present      **Teaching Assistant, Georgia Institute of Technology**      Atlanta, USA
- Works as a teaching assistant for CS7632 Game AI since Fall 2022, holding office hours for programming projects including computational geometry, path planning, projectiles, finite state machine, fuzzy logic, procedural content generation
  - Teaches as a guest lecturer for CEE6185 Construction Automation since Fall 2024, introducing to graduate students topics such as kinematics, 3D reconstruction, AI & ML, object recognition, Scan-to-BIM, mobile robots & SLAM
- 2025/06-2025/07      **Geometry Algorithm Engineer, Manycore Tech**      Shanghai, China
- Incorporated discontinuous functions, forward automatic differentiation, and nonlinear optimization into the graphical parametric engine to perform parameter inversion
  - Developed furniture parameter inversion and panel drag-and-drop functions in pre-research products, and performed front-end and back-end integration testing
- 2020/01-2024/07      **BIM System Engineer, Applied Technologies**      Tokyo, Japan
- Worked as a core member of a Revit secondary development project including functions such as exporting spatial data for construction robotics tool, drawing support tool, and plan layout tool for *Daiwa House*, the largest homebuilder in Japan
  - Took charge of the integration of a geometry calculation, finishing accessory creation, and quantity take-off system for *Starts*, a major construction company in Japan
- 2018/11-2019/12      **Structural Engineer, Jun Sato Structural Engineers**      Tokyo, Japan
- Wrote a control program of an analysis software developed by Prof. Jun Sato and applied several randomized algorithms in deciding the optimal morphology of structures
  - Involved in modeling, plans drawing, structural analysis, and 3D fabrication work in two projects: *Serpentine Pavilion 2019* and *Tree House* used for the Equestrian Center at The Tokyo 2020 Olympics

## Research Projects

- 2026/05- present      **LiDAR-Based Real-Time Temporal Construction Scene Graph**
- Introduced a LiDAR-based temporal scene graph jointly represents free space, static objects, dynamic objects, and structural changes in dynamic and evolving environments
  - Developed a real-time, incremental, event-aware LiDAR mapping framework that integrates short-term dynamic object tracking with long-term change detection
- 2023/09- present      **Online Dynamic Object Detection and Tracking using LiDAR SLAM**
- Proposed a novel framework that uses registered 3D maps from LiDAR SLAM algorithms, occupancy grids, and the Kalman filter to directly detect and track dynamic objects online
  - Improved the detection and tracking accuracy by the combination of a series of delicate considerations, including ray tracing, state transition reward, memory weight factor, object life length, and distance cost function
- 2023/01- present      **Dynamics-Aware Robot Navigation using GNN-Enhanced Planner**
- Integrated GNN into DWA local path planner to predict socially informed spatial offsets for adjusting waypoints generated by the default planner in real-time
  - Verified a practical sim-2-real data-generation and validation pipeline, in which training data are from human inputs, and the trained model is evaluated in a real-world task
- 2022/09-2023/01      **Reconstructing Piping Systems on Class-imbalanced 3D Point Cloud**
- Summarized and extended the limited research on generally applicable frameworks to segment

- and reconstruct 3D pipe systems model using an input of raw data sets from construction sites
- Demonstrated and explained a modified deep learning mode based on PointNet suitable for processing partially scanned pipes, highly imbalanced, and over noisy unstructured data sets

**Programming Skills**

Platforms: Revit, Unity, ROS, Processing, MPI, PyTorch, TensorFlow

Programming languages: Python, C#, C++, Java, MATLAB, Julia, GLSL

**Awards & Certificates**

Awards: 2nd Runner-Up of the 2024 *i3CE*, 2014 JASSO Student Scholarship

Foreign languages: TOEFL 105, GRE 329, Japanese-Language Proficiency Test N1 Level