# Wei Lin

**Bio:**

Wei Lin is a PhD researcher at Tongji University. His PhD thesis is aimed at the digital transformation of underground infrastructures.

In 2019, he earned his B.Eng. degree from Tongji University and was awarded Shanghai Outstanding Graduate. During 2023 and 2024, He worked as a visiting PhD researcher at the University of Cambridge for one year.

**Research interests:** Underground infrastructure; Computer vision; Deep learning; Digital twin; Structural performance

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## Education

- Tongji University      PhD in Engineering      03/2021–Present
  Supervisor: Prof. Xiongyao Xie
- University of Cambridge      PhD in Engineering (visiting)      04/2023–03/2024
  Supervisor: Dr. Brian Sheil
- Tongji University      Master of Engineering      09/2019–02/2021
  Supervisor: Prof. Xiongyao Xie
- Tongji University      Bachelor of Engineering      09/2015–07/2019
- Putian No. 1 Middle School of Fujian Province      09/2012–07/2015

## Experience

- Laboratory Demonstrator      University of Cambridge      10/2023–03/2024
- Research Intern      Zhejiang Scientific Research Institute of Transport      08/2022
- Administrative Assistant      Tongji University      09/2019–02/2021
- Engineering Intern      Shanghai Tunnel Engineering Co., Ltd.      07/2018–08/2018

## Honors & Awards

1. GeoShanghai Prize for Service Award, 05/2024
2. China Scholarship Council Scholarship, 07/2022
3. Engineering Construction Science and Technology Progress Award, Second Prize, 12/2021
4. 'Zhangjiang Guoxin'an Cup' BIM Modelling Competition, Third Prize, 09/2021
5. Tongji Excellent Student, 01/2021
6. Shanghai Outstanding Graduate, 05/2019
7. Tongji Excellent Student, 01/2019
8. Tongji Scholarship of Excellence, Second Prize, 12/2018
9. Tongji Excellent Student, 03/2018
10. China National Scholarship, 11/2017
11. National Zhou Peiyuan Competition on Mechanics, Second Prize, 06/2017
12. Tongji Scholarship of Excellence, First Prize, 12/2016
13. Xu Aqiong Scholarship, 08/2015

## Publications (Underlined co-authors indicate supervisors)

- **Journal Papers (in English)**

1. **Lin, W.**, Sheil, B., Zhang, P., Zhou, B., Wang, C., & Xie, X.* (2024). Seg2Tunnel: A hierarchical point cloud dataset and benchmarks for segmentation of segmental tunnel linings. Tunnelling and Underground Space Technology, 147, 105735. https://doi.org/10.1016/j.tust.2024.105735.

2. **Lin, W.**, Li, P.*, <u>Xie, X.</u>, Cao, Y., & Zhang, Y. (2023). A novel back-analysis approach for the external loads on shield tunnel lining in service based on monitored deformation. Structural Control and Health Monitoring, 2023, 8128701. https://doi.org/10.1155/2023/8128701.

3. **Lin, W.**, Li, P.*, & <u>Xie, X.</u> (2022). A novel detection and assessment method for operational defects of pipe jacking tunnel based on 3D longitudinal deformation curve: A case study. Sensors, 22, 7648. https://doi.org/10.3390/s22197648.

4. Chang, J., Thewes, M., Zhang, D., Huang, H.*, & **Lin, W.** (2024). Deformational behaviors of existing three-line tunnels induced by under-crossing of three-line mechanized tunnels: A case study. Canadian Geotechnical Journal. https://doi.org/10.1139/cgj-2024-0359.

5. Li, K., <u>Xie, X.</u>, Zhou, B.*, Huang, C., **Lin, W.**, Zhou, Y., & Wang, C. (2024). Thickness regression for backfill grouting of shield tunnels based on GPR data and CatBoost & BO-TPE: A full-scale model test study. Underground Space, 17, 100–119. https://doi.org/10.1016/j.undsp.2023.10.003.

(Submitted, under review, or accepted)

6. **Lin, W.**, <u>Sheil, B.</u>, Zhang, P., Li, K., & <u>Xie, X.</u>* (2024). LiningNet: Structural geometry informed 3D deep learning for segmentation of segmental tunnel lining point clouds. Automation in Construction. (Under review)

7. Ye, Z., **Lin, W.**, Faramarzi, A., <u>Xie, X.</u>, & Ninić, J.* (2024). SAM4Tun: No-training model for tunnel lining point cloud component segmentation. Tunnelling and Underground Space Technology. (Under review)

8. Huang, H., Chang, J.*, Zhang, D., Thewes, M., & **Lin, W.** (2024). Improved model-free adaptive control of shield machine posture during tunnelling. Advanced Engineering Informatics. (Under review)

- **Journal Papers (in Chinese)**

1. 邹成路, **林威**, 罗文静, 周彪*, & <u>谢雄耀</u>. (2022). 城市轨道交通车站半成岩深基坑围护结构变形特性研究. 城市轨道交通研究, 25(3), 150–155. https://doi.org/10.16037/j.1007-869x.2022.03.032.

2. <u>谢雄耀</u>, **林威**, 周彪*, & 邹成路. (2022). 半成岩超深基坑围护结构变形与受力特性研究. 结构工程师, 38(1), 164–172. https://doi.org/10.15935/j.cnki.jggcs.2022.01.019.

3. 梁小波, **林威**, 徐金峰, 刘志义, & 赵刚. (2022). 滇中红层软岩填料高路堤稳定性分析. 建筑施工, 44(9), 2248–2251. https://doi.org/10.14144/j.cnki.jzsg.2022.09.068.

(Submitted, under review, or accepted)

4. **林威**, <u>谢雄耀</u>*, 关振长, & 常佳奇. (2024). 基于 RandLA-Net 和改进标签编码的盾构隧道点云逐管片自动分割和变形提取算法. 中国公路学报. (Under review)

5. 吴庆杰, 张红伟, 陈少林, & **林威***. (2024). 基于计算机视觉的盾构隧道管片错台自动测量方法. 施工技术（中英文）. (Accepted)

6. 张洋宾, <u>谢雄耀</u>*, 周彪, **林威**, 曹宇阳, 张列学, & 王承. (2024). 基于关联规则的盾构隧道结构性能评价方法. 同济大学学报（自然科学版）. (Accepted)

- **Conference Papers**

1. **Lin, W.**, <u>Sheil, B.</u>, <u>Xie, X.</u>*, Zhang, Y., & Cao, Y. (2024). Semantic segmentation of large-scale segmental lining point clouds using 3D deep learning. GeoShanghai International Conference 2024, 012026. https://doi.org/10.1088/1755-1315/1337/1/012026.

2. **Lin, W.**\*, <u>Sheil, B.</u>, <u>Xie, X.</u>, Li, K., & Niu, G. (2024). Segment segmentation of tunnel ring point clouds using 3D deep learning. World Tunnel Congress 2024, 3059–3066. https://doi.org/10.1201/9781003495505-406.

3. **Lin, W.**, <u>Xie, X.</u>, Zhou, B., Li, P., & Wang, C. (2023). Refined perception and management of ring-wise deformation information for shield tunnels based on point cloud deep learning and BIM. Eighth International Symposium on Life-Cycle Civil Engineering (IALCCE 2023), 3991–3998. https://doi.org/10.1201/9781003323020-490.

4. **Lin, W.**, <u>Xie, X.</u>*, Li, P., Xiao, B., Lu, X., Feng, B., Jin, P., & Hu, Y. (2022). Prediction of settlement

induced by tidal fluctuation for underwater shield tunnel during service based on historical monitoring data. 2022 8th International Conference on Hydraulic and Civil Engineering: Deep Space Intelligent Development and Utilization Forum (ICHCE), 1042–1047. https://doi.org/10.1109/ICHCE57331.2022.10042697.

- **Patents (in Chinese)**
1. 牛刚, 秦宝军, 周志广, 肖中林, 杨庆, 孙斌, 邓魏彬, 王亮, 马俊雨, **林威**, 周彪, & 谢雄耀. (2024). 一种基于点云特征深度学习的盾构隧道单环点云分割方法. (发明, 受理)
2. 周应新, 谢雄耀, 周彪, **林威**, 张洋宾, 陈思晗, 徐泓睿, 钱正富, 曾维成, 杨俊宏, 唐能, 刘志义, 史明梅, 唐忠林, 胡兴云, 赵刚, & 叶朋果. (2022). 一种用于差异沉降控制的路堤水载预压反馈调节系统. (发明, 公开)
3. 鲁正, 常佳奇, **林威**, & 宰秋锐. (2018). 可变阻尼铅芯橡胶阻尼器. (发明, 授权)
4. 鲁正, **林威**, 常佳奇, & 宰秋锐. (2018). 装配式建筑墙梁节点. (实用新型, 授权)
5. 鲁正, 宰秋锐, 常佳奇, & **林威**. (2018). 钢结构装配式建筑墙板节点. (实用新型, 授权)
- **Software (in Chinese)**
1. 浙江省交通运输科学研究院. (2022). 山岭隧道横向变形点云处理系统 1.0.

# Activities

- **Presentations**

(in English)
1. Semantic segmentation of large-scale segmental lining point clouds using 3D deep learning, GeoShanghai International Conference 2024, Shanghai, 27/05/2024
2. Computer vision for the segmentation of tunnel point clouds: Dataset and network, World Tunnel Congress 2024, Shenzhen, 24/04/2024
3. Understanding tunnel point clouds using 3D deep learning, Norwegian Geotechnical Institute, online, 01/11/2023
4. Refined perception and management of ring-wise deformation for segmental linings using 3D deep learning and BIM, Eighth International Symposium on Life-Cycle Civil Engineering (IALCCE 2023), Milan, 04/07/2023
5. The digital twin of shield tunnels for structural analysis, hyperTunnel, online, 05/05/2023
6. The digital twin of shield tunnels for structural analysis, Mott MacDonald, online, 27/04/2023

(in Chinese)
7. 用于大规模盾构隧道点云自动处理的计算机视觉技术, Shanghai Urban Construction Design and Research Institute (SUCDRI), Shanghai, 22/07/2024
- **Posters**
1. Revealing high-fidelity and present-day geometry of segmental linings by AI, 11th International Symposium of Geotechnical Aspects of Underground Construction in Soft Ground (IS-Macau 2024), Macau, 14–17/06/2024
2. Prediction of settlement induced by tidal fluctuation for underwater shield tunnel during service based on historical monitoring data, 2022 8th International Conference on Hydraulic and Civil Engineering: Deep Space Intelligent Development and Utilization Forum (ICHCE), Xi'an, 25–27/11/2022
- **Reviews**
1. Tunnelling and Underground Space Technology, 5 reviews
2. Underground Space, 7 reviews

# Supervision

- **Tom Hill, University of Cambridge, fourth-year project, 2024**
  Supervisor: Dr. Brian Sheil
  Co-supervisor: Wei Lin
- **Zeyu Wu, Tongji University, Bachelor thesis, 2023**

Research on intelligent early warning technology for parametric construction of deep foundation pit in soft soil in Shanghai
Supervisor: Prof. Xiongyao Xie
Co-supervisor: Wei Lin

- **Meitao Zou, Tongji University, Bachelor thesis, 2022**
  Ultra-long underground expressway air-ground fusion refinement intelligent measurement and control technology
  Supervisor: Prof. Xiongyao Xie
  Co-supervisor: Wei Lin

# Grants

- **PI**
1. China Scholarship Council [202206260174]                                    04/2023–03/2024
2. Shanghai Municipal Education Commission [201710247118]                      01/2017–01/2018
- **Researcher**
1. Ministry of Science and Technology of the People's Republic of China [2023YFC3806701]
2. Ministry of Science and Technology of the People's Republic of China [2023YFC3806702]
3. Ministry of Science and Technology of the People's Republic of China [2023YFC3806705]
4. Ministry of Science and Technology of the People's Republic of China [2019YFC0605100]
5. Ministry of Science and Technology of the People's Republic of China [2019YFC0605103]
6. National Natural Science Foundation of China [52378408]
7. National Natural Science Foundation of China [52038008]
8. National Natural Science Foundation of China [51978431]
9. Science and Technology Commission of Shanghai Municipality [22DZ1203004]
10. Science and Technology Commission of Shanghai Municipality [20DZ1202004]
11. Science and Technology Commission of Shanghai Municipality [2017SHZDZX02]
12. Department of Transport of Yunnan Province [2021-7]
13. State Grid Shanghai Municipal Electric Power Company [52090W23000B]
14. State Grid Shanghai Municipal Electric Power Company [52090W220001]
15. Guangzhou Metro Design & Research Institute Co., Ltd. [KY-B-2016-018]