Chen Chen

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Key Areas of Research

- Smart construction
- Smart manufacturing
- Smart asset management
- Smart maintenance

Education

National University of Singapore, July 2016, Singapore
Ph.D in Construction Management
Thesis: Crane location optimization in construction site
Supervisor: David Chua Kim Huat

University of Michigan, December 2006, United States
M.Sc of Naval Architecture and Marine Engineering
Supervisor: David J. Singer

Shanghai Jiao Tong University, January 2005, China
M.Eng of Naval Architecture, Ocean and Civil Engineering
Supervisor: Shijun Liao

Shanghai Jiao Tong University, July 2002, China
B.Eng in Transportation

Work Experience

Kaizen AI & Robotics
Mentor Town Consultancy
Entrepreneur (January 2025 - current)

- Lead Kaizen AI & Robotics and Mentor Town Consultancy Pte Ltd, positioning both as digital transformation partners for Singapore's construction sector.
- Drive adoption of AI, automation, and robotics solutions to enhance productivity and operational efficiency in prefabrication and construction workflows.
- Engage with industry stakeholders through involvement in the Prefabrication Association of Singapore for Precast & Steel Limited (PFAPS) network.
- Deliver workforce upskilling initiatives as an ACLP, DDDLP-certified SkillsFuture training provider, focusing on digitalization and advanced manufacturing practices.

Nanyang Technological University, Singapore
Part-time Lecturer (February – July 2025)

- GP8000 Artificial Intelligence (AI Literacy)

Senior Research Fellow (April 2023 – December 2024)

- Leagile construction supply chain.
- Zero-carbon buildings.
- FYP and PhD student supervisor.
- Submitted proposals:
  1. "Smart digital twin-based decision support system for sustainable retrofits of building facades", 2023, for MOE Tier 2 EP5MC (Co-PI).
  2. "Development of a generative AI assisted smart facility management system for sustainable public healthcare facilities", 2024, for City of Tomorrow (Co-PI)

- Teaching
  1. "Research Methods for Built Environment" for graduate students.
  2. "Driving Sustainability in Green Technology – The Future of Smart Building and Smart City", MySkillsFuture course for professionals.

Tongji University, China
Research Professor (May 2021 – March 2023)
- Division of Civil Engineering.
- Elected to National Talent Program.
- Submitted proposals:
  1. Study on digital twin-based smart scheduling algorithm toward precast production.
  2. BIM-based automatic coding method for building embodied carbon calculation.
- PhD student supervisor
- Teaching
  1. "Scientific writing" for graduate students.
  2. Form teacher for undergraduate year 1 students.

Nanyang Technological University, Singapore
Visiting Scientist (June 2022 – January 2023)
- Production planning and scheduling for precast factory.
- Leagile construction supply chain.
- Submitted proposals:
  1. "Agile precast construction supply chain", for Project 4 of Theme B at Singapore-Berkeley Centre for Research Excellence on "Smart Construction" Technologies, funded by National Research Foundation (NRF).
  2. "Designing event-driven systems for production planning and control in Industry 4.0 manufacturing", Future Communications Research and Development Programme (FCP) grant call, funded by IMDA and NRF.
  3. "Leagile manufacturing: vertical integration in Industry 4.0", for Hyundai Motor Group Innovation Center in Singapore (HMGICS) -NTU Corp Lab for Smart Factory, funded by NRF.

Nanyang Technological University, Singapore
Research Fellow (June 2015 – March 2021)
- Scan-to-BIM technology.
- Integrated digital delivery.
- Automated PBU manufacturing job shop production scheduling and facility layout optimization.
- Maritime sustainability.

National University of Singapore, Singapore
Research Associate (September 2013 – May 2015)
- Crane location optimization in construction site.

Sembcorp Marine (Jurong Shipyard), Singapore
Research Engineer (September 2008 – August 2013)
- 4D production scheduling.
- Offshore semi-submersible platform and jackup drilling rig design.
- Newbuild ship design.

IBM, China
Project Manager (February 2007 – August 2008)
- Management trainee.

American Bureau of Shipping (Texas Houston Headquarter), United States
Intern (June 2006 – August 2006)
- Lifecycle ship structure assessment.

Awards
1. The Third Grade of The Huang Jinzhi Research Scholarship awarded at Tongji University, 2021.
2. Scholarship of The Paper Most Relevant to Building Industry awarded at AUBEA by Curtin University, 2018.
3. The Third Grade of The Best Paper awarded in the 5th ABB National Engineer Paper Competition of Automated System, 2011.

Invention / Technology Disclosure
1. **Chen Chen**, Cai Yiyu, 2020, "Automatic BIM reconstruction of interiors using Bayesian network", Singapore provisional patent, 10202011492P.
2. **Chen Chen,** 2019, "An obstacle avoidance routing algorithm in grid maps based on goal-oriented and tabu search pattern", copyrighted software, NTU Ref: 2019-127.

Current PhD students under Supervision
1. Han Jinchi (2021), PhD student, School of Civil and Environmental Engineering, Nanyang Technological University.
2. Xing Zijie (2023), PhD student, School of Civil and Environmental Engineering, Nanyang Technological University.

Referees
1. Robert Tiong, Associate Professor, School of Civil and Environmental Engineering, Nanyang Technological University, clktiong@ntu.edu.sg
2. David Chua, Professor, Department of Civil and Environmental Engineering, National University of Singapore, ceedavid@nus.edu.sg
3. Justin Yeoh, Lecturer, Department of Civil and Environmental Engineering, National University of Singapore, ceeykw@nus.edu.sg

Annex

Journal Publication (* corresponding author)

1. Zijie Xing, **Chen Chen***, Robert Tiong, 2025, "Learning-enhanced differential evolution for multi-mode resource-constrained multi-project scheduling problem in industrial prefabrication", *Building*, 15: 1996. DOI: 10.3390/buildings15121996
2. Jinchi Han, **Chen Chen***, Robert Tiong, Kan Wu, 2024, "Smart multi-project scheduling and multi-skilled workforce assignment considering learning effects for PBU production", *Automation in Construction*, 166: 105626. DOI: 10.1016/j.autcon.2024.105626
3. **Chen Chen***, Solutions to address the low-capacity utilization issue at Singapore's integrated construction and prefabrication hubs (ICPHs), 2024, *Information*, 15: 458. DOI: 10.3390/info15080458
4. Jinchi Han, **Chen Chen***, Robert Lee Kong Tiong, Kan Wu, Daryl Kok Hoong Chew, 2024, "Strategic workforce planning in PBU production: An advanced Markovian approach", *Journal of Construction Engineering and Management*, 150(8): 04024097. DOI: 10.1061/JCEMD4.COENG-14514
5. Zedong David Herbert Ba, Qian Wang, **Chen Chen*,** Ziwen Liu*, Luke Lu Chang Peh, Robert Tiong Lee Kong, 2024, "Change management of organizational digital transformation: A proposed roadmap for Building Information Modelling-enabled facilities management", Buildings, 14(1): 27. DOI: 10.3390/buildings14010027
6. **Chen Chen***, Robert Tiong, Kan Wu, 2023, "Identifying the promising production planning and scheduling method to Industry 4.0: a literature review", *Production and Manufacturing Research*. DOI: 10.1080/21693277.2023.2279329
7. **Chen Chen***, Jinchi Han, Ziwen Liu*, Robert Tiong, 2023, "Flow shop scheduling of hybrid make-to-stock and make-to-order in a distributed precast concrete production system", *Cleaner Logistics and Supply Chain*, 7: 100106. DOI: 10.1016/j.clscn.2023.100106
8. **Chen Chen***, Ziwen Liu*, 2023, "A fast method for identifying room configurations from unit boundaries in existing residential buildings", *Buildings*, 13(2): 357. DOI:10.3390/buildings13020357
9. **Chen Chen***, Xing Zijie, Xi Yonghui, Robert Tiong, 2022, "Ensuring sufficient cabin hospital beds for curbing the spread of COVID-19 – Findings from petri net analysis", *Heloyin*, 8(10): e11202. DOI: 10.1016/j.heliyon.2022.e11202
10. Chenyuan Ji, Yitong Wu, Zengfeng Zhao*, **Chen Chen***, Lei Yao, 2022, "Life cycle assessment of off-site construction using ultra-high-performance concrete", *Sustainability*, 14(11): 6907. DOI: 10.3390/su14116907
11. **Chen Chen,** Zengfeng Zhao*, Jianzhuang Xiao, Robert L. K. Tiong, 2021, "A conceptual framework for estimating building embodied carbon based on digital twin technology and life cycle assessment", *Sustainability,* 13(24): 13875. DOI: 10.3390/su132413875
12. **Chen Chen**, Limao Zhang*, Robert L. K. Tiong, 2020, "A new lossy compression algorithm for wireless sensor networks using Bayesian predictive coding", *Wireless Networks,* 26(8): 5981-5995. DOI: 10.1007/s11276-020-02425-w
13. **Chen Chen***, Thomas Phang, Robert L. K. Tiong, 2020, "Planning semi-automated precast production using GA", *International Journal of Industrialized Construction*, 1(1): 48-63. DOI: 10.29173/ijic215
14. **Chen Chen***, Ricardo Chacón, Robert L. K. Tiong, 2020, "Using genetic algorithm to automate the generation of open-plan office layout", *International Journal of Architectural Computing*, 19(3): 449-465. DOI: 10.1177/1478077120943532
15. **Chen Chen**, Limao Zhang*, Robert L. K. Tiong, 2020, "A novel learning cloud Bayesian network for risk measurement", *Applied Soft Computing Journal*, 87: 105947. DOI: 10.1016/j.asoc.2019.105947
16. Thomas C. H. Phang, **Chen Chen***, Robert L. K. Tiong, 2019, "New model for identifying critical success factors influencing BIM adoption from precast concrete manufacturers' view", *Journal of Construction Engineering and Management*, 146(4): 04020014. DOI:10.1061/(ASCE)CO.1943-7862.0001773

17. **Chen Chen***, Robert L. K. Tiong, 2019, "Using queuing theory and simulated annealing to design the facility layout in an AGV-based modular manufacturing system", *International Journal of Production Research*, 57(17): 5538-5555. DOI:10.1080/00207543.2018.1533654
18. **Chen Chen***, Robert L. K. Tiong, I-Ming Chen, 2018, "Using a genetic algorithm to schedule the space-constrained AGV-based prefabricated bathroom units manufacturing system", *International Journal of Production Research*, 57(10): 3003-3019. DOI: 10.1080/00207543.2018.1521532
19. **Chen Chen***, Duc Tran Huy, Robert L. K. Tiong, I-Ming Chen, Yiyu Cai, 2019, "Optimal facility layout planning for AGV-based modular prefabricated manufacturing system", *Automation in Construction*, 98: 310-321. DOI: 10.1016/j.autcon.2018.08.008
20. **Chen Chen**, Jasmine Siu Lee Lam*, 2018, "Sustainability and interactivity between cities and ports: a two-stage Data Envelopment Analysis (DEA) approach", *Maritime Policy & Management*, 45(7): 944-961. DOI: 10.1080/03088839.2018.1450528
21. **Chen Chen**, Chun Wang, Shi Jun Liao*, 2005, "Explicit analytic solutions of KdV equation given by the Homotopy Analysis Method", *Advances in Engineering Mechanics – Reflections and Outlooks*, 70-83. DOI: 10.1142/9789812702128_0005

Conference Paper

1. **Chen Chen***, Nathanael Foo Song Ern, Lee Woo Bin, Zheng Qing, Robert Tiong, 2023, "Understanding demand for project manager competencies in the Singapore construction industry: data mining approach", *World Engineers Summit,* Singapore.
2. **Chen Chen*,** Duc Tran Huy, Lee Kong Tiong, I-Ming Chen, Yiyu Cai, 2018, "The optimal sizes of workstation area and storage area in a precast plant for manufacturing of modular prefabricated products", *The 42nd Annual Conference of Australian Universities Building Education Association (AUBEA)*, Singapore.
3. **Chen Chen*,** Kim Huat Chua, Liguo Yang, 2012, "Genetic algorithm to dry dock block arrangement considering subsequent ships", *The 3rd International Conference on Engineering, Project, and Production Management (EPPM)*, Brighton,United Kingdom.
4. **Chen Chen*,** Kim Huat Chua, Keng Hwee Wee, 2011, "Polygon nesting using genetic algorithm", *The 3rd Prize in the 5th ABB Cup National Automation Thesis Contest*, Beijing, China.
5. **Chen Chen*,** Kim Huat Chua, 2011, "Optimized shipyard steel plate cutting plan based on genetic algorithm", *The 2nd International Conference on Engineering, Project, and Production Management (EPPM)*, Singapore.
6. Wen Ping Wang*, Tan Hong Seow, Keng Hwee Wee, **Chen Chen,** 2011, **"**DP capability assessment tool for semi-submersible", *Dynamic Positioning Asia Conference & Exhibition*, Singapore.

Book

1. **Chen Chen,** Wu Yufei, 2025, "Empowering young minds: An inspiring AI course for children", Patridge, United States.
2. **Chen Chen,** Hang Xu, 2005, "Beyond perturbation: introduction to the Homotopy Analysis Method (Chinese version)", *Science Publishing House*, China.

Public Speech

1. 5th Workshop on Civil and Environmental Engineering at NUS, Topic: Enhance the productivity of L-shaped wall panel production for PBU, 25 July, 2025.
2. World Engineers Summit, Topic: Understanding demand for project manager competencies in the Singapore construction industry: data mining approach, 8 November, 2023.
3. 智汇论坛，Topic: 预制混凝土构件工厂的生产管理 4.0：让供应链走向精敏 (Precast factory management 4.0: toward leagile)，20 April, 2023.

4. 同日智能技术研究员系列讲座，Topic: 低碳建筑未来——传统劳动密集型行业低碳转型之路的探索 (The future of low carbon construction – transformation of a traditional labor-intensive industry)，5 November, 2023.