

Siyang Gao

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RESEARCH INTERESTS	Embodied AI, large language models, simulation modeling and optimization, digital twin, health-care management	
ACADEMIC EXPERIENCE	Professor Department of Systems Engineering, and Department of Data Science, City University of Hong Kong Associate Professor Department of Systems Engineering, and Department of Data Science, City University of Hong Kong Assistant Professor Department of Systems Engineering and Engineering Management, City University of Hong Kong	July 2026 to present July 2020 to June 2026 Aug 2014 to June 2020
ACADEMIC LEADERSHIP	City University of Hong Kong, Department of Systems Engineering - Associate Head - Doctorate Program Leader (Engineering Doctorate (Chinese)) - Undergraduate Program Leader (Intelligent Manufacturing Engineering) - Master's Program Leader (Engineering Management)	2023-Present 2024-Present 2021-2023 2018-2021
EDUCATION	Ph.D. Industrial and Systems Engineering, University of Wisconsin-Madison, May 2014. Thesis: <i>Statistical Optimization: Theory and Applications</i> B.S. Statistics and Probability, Peking University, China, May 2009.	
HONORS AND AWARDS	- Finalist, Winter Simulation Conference Best Contributed Theoretical Paper, 2025 - IEEE Transactions on Automation Science and Engineering Best Associate Editor Award, 2024 - Finalist, POMS International Conference in China, Best Paper Award, 2024 - Journal of Simulation Outstanding Reviewer, 2021 - Finalist, INFORMS Conference on Service Science, Best Student Paper Competition, 2020 (as advisor) - Winner, IEEE Conference on Automation Science and Engineering (IEEE-CASE) Best Conference Paper Award, 2019 - Winner, International Conference on Logistics and Maritime Systems (LOGMS) Best Paper Competition, 2019 3rd prize, POMS International Conference in China Best Student Paper, 2019 (as advisor) 2nd prize, Sichuan Outstanding Social Science Award, 2019 - Winner, International Research Conference on Systems Engineering and Management Science (IRC-SEMS) Best Young Faculty Paper Award, 2018 - Winner, Ho Pan Qing Yi Paper Award, 2018 - Winner, International Research Conference on Systems Engineering and Management Science (IRC-SEMS) Best Student Paper Award, 2017 (as advisor)	

- Finalist, INFORMS Service Science Student Paper Competition, 2016 (as advisor)
- Rea C. and David Gustafson Scholarship, University of Wisconsin-Madison, 2013
- Travel Award, University of Wisconsin-Madison, 2010

BOOK CHAPTER

- W. Chen, **S. Gao**, and C.-H. Chen, “A Bayesian formulation for optimizing resource allocation via simulation”, In *Encyclopedia in Operations Management*, 188-203, 2026, Elsevier.

REFEREED JOURNAL PUBLICATIONS

1. J. Li, J. Du, **S. Gao**, Q. Ye, and G. Jiang, “Enhancing electric vehicle charging station design using multi-fidelity simulations”, *Production and Operations Management*, In press.
— Finalist, POMS International Conference in China, Best Paper Award, 2024
2. L. Yang, **S. Gao**, C. Li, and Y. Wang, “Stochastically constrained best arm identification with Thompson sampling”, *Automatica*, 176, 112223, 2025.
3. S. Cakmak, Y. Wang, **S. Gao**, and E. Zhou, “Contextual ranking and selection with Gaussian processes and optimal computing budget allocation”, *ACM Transactions on Modeling and Computer Simulation*, 34(2), 1-24, 2024.
4. J. Du, **S. Gao** and C.-H. Chen, “A contextual ranking and selection method for personalized medicine”, *Manufacturing & Service Operations Management*, 26(1), 167-181, 2024.
— Finalist of INFORMS Conference on Service Science Best Student Paper Competition 2020
— Winner of IEEE-CASE Best Conference Paper Award 2019
— Winner of International Conference on LOGMS Best Paper Competition 2019
— 3rd prize of POMS International Conference (China) Best Student Paper 2019
5. Y. Li and **S. Gao**, “Convergence rate analysis for optimal computing budget allocation algorithms”, *Automatica*, 153, 111042, 2023.
6. Y. Li, **S. Gao** and T. Shi, “Asymptotic optimality of myopic ranking and selection procedures”, *Automatica*, 151, 110896, 2023.
7. C. Li, **S. Gao** and J. Du, “On the convergence rates of stochastic kriging assisted-simulation with covariates”, *INFORMS Journal on Computing*, 35(2), 386-402, 2023.
8. W. Chen, **S. Gao**, W. Chen and J. Du, “Optimizing service system resource allocations with probabilistic measures: A simulation optimization perspective”, *Production and Operations Management*, 32(1), 65-81, 2023.
9. M. Qin, Z. Shi, W. Chen, **S. Gao** and L. Shi, “Wafer defect inspection optimization with partial coverage: A numerical approach”, *IEEE Transactions on Automation Science and Engineering*, 18(4), 1916-1927, 2020.
10. Z. Shi, **S. Gao**, H. Xiao and W. Chen, “A worst-case formulation for constrained ranking and selection with input uncertainty”, *Naval Research Logistics*, 66, 648-662, 2019.
11. F. Gao, Z. Shi, **S. Gao** and H. Xiao, “Efficient simulation budget allocation for subset selection using regression metamodels”, *Automatica*, 106, 192-200, 2019.
12. F. Gao, **S. Gao**, H. Xiao and Z. Shi, “Advancing constrained ranking and selection with regression in partitioned domains”, *IEEE Transactions on Automation Science and Engineering*, 16(1), 382-391, 2019.
13. Q. Zhang, L. Zhong, **S. Gao** and X. Li, “Optimizing HIV interventions for multiplex social networks via partition-based random search”, *IEEE Transactions on Cybernetics*, 48(12), 3411-3419, 2018.

14. H. Xiao and **S. Gao**, “Simulation budget allocation for selecting the top-m designs with input uncertainty”, *IEEE Transactions on Automatic Control*, 63(9), 3127-3134, 2018.
15. **S. Gao**, L. Shi and Z. Zhang, “A peak-over-threshold search method for global optimization”, *Automatica*, 89, 83-91, 2018.
16. F. Gao and **S. Gao**, “A new strategy for selecting good enough designs using optimal computing budget allocation”, *Journal of Simulation*, 12(3), 238-247, 2018.
— Winner of IRC-SEMS Best Student Paper Award 2017
17. H. Xiao, **S. Gao** and L. H. Lee, “Simulation budget allocation for simultaneously selecting the best and worst subsets”, *Automatica*, 84, 117-127, 2017.
— 2nd prize of Sichuan Outstanding Social Science Award 2019
— Winner of Ho Pan Qing Yi Paper Award 2018
18. **S. Gao**, H. Xiao, E. Zhou and W. Chen, “Robust ranking and selection with optimal computing budget allocation”, *Automatica*, 81, 30-36, 2017.
19. **S. Gao**, W. Chen and L. Shi, “A new budget allocation framework for the expected opportunity cost”, *Operations Research*, 65(3), 787-803, 2017.
— Winner of IRC-SEMS Best Young Faculty Paper Award 2018
20. H. Guo, **S. Gao**, K. L Tsui and T. Niu, “Simulation optimization for medical staff configuration at emergency department in Hong Kong”, *IEEE Transactions on Automation Science and Engineering*, 14(4), 1655-1665, 2017.
— Finalist of INFORMS Service Science Student Paper Competition 2016
21. **S. Gao** and W. Chen, “A partition-based random search for stochastic constrained optimization via simulation”, *IEEE Transactions on Automatic Control*, 62(2), 740-752, 2017.
22. **S. Gao**, L. H. Lee, C.-H. Chen and L. Shi, “A sequential budget allocation framework for simulation optimization”, *IEEE Transactions on Automation Science and Engineering*, 14(2), 1185-1194, 2017.
23. **S. Gao** and W. Chen, “Efficient feasibility determination with multiple performance measure constraints”, *IEEE Transactions on Automatic Control*, 62(1), 113-122, 2017.
24. **S. Gao** and W. Chen, “A new budget allocation framework for selecting top simulated designs”, *IIE Transactions*, 48(9), 855-863, 2016.
25. **S. Gao** and W. Chen, “Efficient subset selection for the expected opportunity cost”, *Automatica*, 59, 19-26, 2015.
26. **S. Gao** and L. Shi, “Selecting the best simulated design with the expected opportunity cost bound”, *IEEE Transactions on Automatic Control*, 60(10), 2785-2790, 2015.
27. W. Chen, **S. Gao**, C.-H. Chen and L. Shi, “An optimal sample allocation strategy for partition-based random search”, *IEEE Transactions on Automation Science and Engineering*, 11, 177-186, 2014.
28. H. H. Zhang, **S. Gao**, W. Chen, L. Shi, W. D. D’Souza and R. R. Meyer, “A surrogate-based metaheuristic global search method for beam angle selection in radiation treatment planning”, *Physics in Medicine and Biology*, 58, 1933-1946, 2013.
29. S. Chen, T. Zhu, Z. Wang, J. Zhang, K. Wang, R. Zhou, **S. Gao**, T. Xiao, Y. W. Teh, J. He, and M. Li, “Why do LLM agents fail in exploring new environments? A world-modeling perspective”, *Proceedings of the 2026 Conference on Empirical Methods in Natural Language Processing (EMNLP)*, 2026.
30. Y. Wang, K. Zhang, M. Wang, **S. Gao**, and N. Yin, “USBD: Universal structural basis distillation for source-free graph domain adaptation”, *Proceedings of the 2026 ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)*, 2026.

31. Z. Qiao, J. Lyu, C. Bai, P. Wang, **S. Gao**, and S. Qiu, “Unifying value alignment and assignment in cross-domain offline reinforcement learning with heterogeneous datasets”, *Proceedings of the 2026 International Conference on Machine Learning (ICML)*, 2026.
32. Z. Qiao, J. Lyu, B. Lyu, Y. Shu, **S. Gao**, and S. Qiu, “Model-based offline RL via robust value-aware model learning with implicitly differentiable adaptive weighting”, *Proceedings of the 2026 International Conference on Learning Representations (ICLR)*, 2026.
33. Z. Qiao, R. Yang, J. Lyu, X. Li, Z. Dai, Z. Yang, **S. Gao**, and S. Qiu, “Dual-robust cross-domain offline reinforcement learning against dynamics shifts”, *Proceedings of the 2026 International Conference on Learning Representations (ICLR)*, 2026.
34. Y. Wang, S. Fan, M. Wang, **S. Gao**, C. Wang, and N. Yin, “DAMR: Efficient and adaptive context-aware knowledge graph question answering with LLM-guided MCTS”, *Proceedings of the 2026 International Conference on Learning Representations (ICLR)*, 2026.
35. J. Du, **S. Gao**, and I. Ryzhov, “Revisiting an open question in ranking and selection under unknown variances”, *Proceedings of the 2025 Winter Simulation Conference (WSC)*, 378-389, 2025.
— Finalist of Winter Simulation Conference Best Contributed Theoretical Paper, 2025
36. M. Ding, **S. Gao**, and Q. Zhao, “Stopping rules for sampling in precision medicine”, *Proceedings of the 2025 Winter Simulation Conference (WSC)*, 929-940, 2025.
37. S. Chen, J. Zhang, T. Zhu, W. Liu, **S. Gao**, M. Xiong, M. Li, and J. He, “Bring reason to vision: Understanding perception and reasoning through model merging”, *Proceedings of the 42nd International Conference on Machine Learning (ICML)*, 2025.
38. S. Chen, T. Zhu, R. Zhou, J. Zhang, **S. Gao**, J. Niebles, M. Geva, J. He, J. Wu, and M. Li, “Why is spatial reasoning hard for vlms? An attention mechanism perspective on focus areas”, *Proceedings of the 42nd International Conference on Machine Learning (ICML)*, 2025.
39. F. Zhang, **S. Gao**, and Jie Song, “Offline contextual learning with correlated Bayesian beliefs”, *Proceedings of the 2024 IEEE International Conference on Automation Science and Engineering (CASE)*, 2496-2500, 2024.
40. S. Chen, M. Xiong, J. Liu, Z. Wu, T. Xiao, **S. Gao**, and J. He, “In-context sharpness as alerts: An inner representation perspective for hallucination mitigation”, *Proceedings of the 41st International Conference on Machine Learning (ICML)*, 2024.
41. L. Yang, **S. Gao** and C. Ho, “Improving the knowledge gradient algorithm”, *Advances in Neural Information Processing Systems (NeurIPS)*, 61747-61758, 2023.
42. Z. Yu, L. Dai, S. Xu, **S. Gao**, and C. Ho, “Fast Bellman updates for Wasserstein distributionally robust MDPs”, *Advances in Neural Information Processing Systems (NeurIPS)*, 30554-30578, 2023.
43. S. Chen, Y. Zhao, J. Zhang, I.-C. Chern, **S. Gao**, P. Liu, and J. He, “FELM: Benchmarking factuality evaluation of large language models”, *Advances in Neural Information Processing Systems (NeurIPS)*, 44502-44523, 2023.
44. Y. Li and **S. Gao**, “On the finite-time performance of the knowledge gradient algorithm”, *Proceedings of the 39th International Conference on Machine Learning (ICML)*, 12741-12764, 2022.
45. Y. Li and **S. Gao**, “On the convergence of optimal computing budget allocation algorithms”, *Proceedings of the 2021 Winter Simulation Conference (WSC)*, 1-12, 2021.
46. S. Cakmak, E. Zhou and **S. Gao**, “Contextual ranking and selection with Gaussian processes”, *Proceedings of the 2021 Winter Simulation Conference (WSC)*, 1-12, 2021.

47. J. Du, **S. Gao**, and C.-H. Chen, “Selecting the optimal system design under covariates”, *Proceedings of the 2019 IEEE International Conference on Automation Science and Engineering (CASE)*, 547-552, 2019.
48. **S. Gao**, C. Li and J. Du, “Rate analysis for offline simulation online application”, *Proceedings of the 2019 Winter Simulation Conference (WSC)*, 3468-3479, 2019.
49. W. Liu, **S. Gao**, and L. H. Lee, “A multi-objective perspective on robust ranking and selection”, *Proceedings of the 2017 Winter Simulation Conference (WSC)*, 2116-2127, 2017.
50. F. Gao and **S. Gao**, “Selecting good enough simulated designs”, *Proceedings of the 2017 IEEE International Conference on Automation Science and Engineering (CASE)*, 1053-1058, 2017.
51. **S. Gao**, H. Xiao, E. Zhou, and W. Chen, “Optimal computing budget allocation with input uncertainty”, *Proceedings of the 2016 Winter Simulation Conference (WSC)*, 839-846, 2016.
52. F. Gao and **S. Gao**, “Optimal computing budget allocation with exponential underlying distribution”, *Proceedings of the 2016 Winter Simulation Conference (WSC)*, 682-689, 2016.
53. **S. Gao** and W. Chen, “Feasibility determination in presence of multiple performance measure constraints”, *Proceedings of the 2016 IEEE International Conference on Industrial Technology (ICIT)*, 988-992, 2016.
54. S. Zhang, J. Xu, E. Huang, C.-H. Chen, and **S. Gao**, “Improving ordinal transformation through optimal combination of multi-model predictions”, *Proceedings of the 2016 IEEE International Conference on Industrial Technology (ICIT)*, 1545-1549, 2016.
55. **S. Gao** and W. Chen, “A note on the subset selection for simulation optimization”, *Proceedings of the 2015 Winter Simulation Conference (WSC)*, 3768-3776, 2015.
56. **S. Gao** and L. Shi, “An optimal opportunity cost selection procedure for a fixed number of designs”, *Proceedings of the 2014 Winter Simulation Conference (WSC)*, 3952-3958, 2014.
57. **S. Gao**, X. Zhang, and L. Shi, “Evaluation of improvement probability for IMRT plans”, *Proceedings of the 2013 IEEE International Conference on Automation Science and Engineering (CASE)*, 474-479, 2013

FUNDED PROJECTS

Research

- “Finite-time analysis of a class of simulation optimization algorithms” (**PI**), Hong Kong Research Grant Council, General Research Fund, Project No. 11217925, 2025-2028, HK\$1,108,779.
- “Research on the whole chain multi-dimensional collaboration and cross-scale integration optimization of high-end equipment digital intelligent supply chain” (**co-I**), Key Program of the National Natural Science Foundation of China, Project No. 72331004, 2024-2028, RMB2,650,000.
- “Personalized medical decision making” (**PI**), National Science Foundation of China, Project No. 72371214, 2024-2027, RMB533,000.
- “Optimizing interventions for changing HIV risk behaviors via temporal link prediction in MSM social networks”, (**Co-I**), Hong Kong Research Grant Council, General Research Fund, Project No. 11218221, 2022-2024, HK\$601,000.
- “Formulation and analysis of simulation with covarites” (**PI**), City University of Hong Kong, Strategic Research Grant, Project No. 7005568, 2020-2022, HK\$100,000.
- “Contextual ranking and selection” (**PI**), City University of Hong Kong, Strategic Research Grant, Project No. 7005269, 2019-2021, HK\$100,000.
- “Ranking and selection with parallel computing” (**PI**), City University of Hong Kong, Strategic Research Grant, Project No. 7005095, 2018-2020, HK\$100,000.

- “Ranking and selection under input uncertainty” (**PI**), Hong Kong Research Grant Council, General Research Fund, Project No. 11214317, 2018-2020, HK\$582,000.
- “Simulation-based optimization for medical staff configuration at emergency department” (**Co-I**), National Science Foundation of China, Project No. 71701132, 2018-2020, RM-B170,000.
- “Efficient algorithms for constrained simulation optimization” (**PI**), Hong Kong Research Grant Council, Early Career Scheme, Project No. 21204316, 2017-2019, HK\$456,050.
- “Optimal control of discrete event dynamic systems with constraints” (**PI**), National Science Foundation of China, Project No. 61603321, 2017-2019, RMB190,000.
- “A new selection framework with the opportunity cost” (**PI**), City University of Hong Kong, Strategic Research Grant, Project No. 7004464, 2015-2017, HK\$100,000.
- “Efficient simulation budget allocation for the expected opportunity cost” (**PI**), City University of Hong Kong, Start-Up Grant, Project No. 7200419, 2014-2016, HK\$200,000.

Teaching

- “Enhancing learning experience by introducing Monte Carlo simulation technologies” (**PI**), City University of Hong Kong, Start-Up Grant, Project No. 6000528, 2014-2016, HK\$100,000.

TEACHING EXPERIENCE

- SYE3101 – Basic Methodologies and Tools for Risk Engineering
- JC4031 – Management of Technological Innovation
- SYE4103 – Decision Analysis & Risk Management
- SYE5006 – Operations Management (rated top 5% university-wide in 2022)
- SYE6045 – Industrial Case Study
- SYE8202 – Systems Modeling and Management
- SYE8025P – Research Methods in Engineering Management (rated top 5% university-wide in 2025)

SERVICE

Professional Society Service

- Associate Editor:
IIESE Transactions (2026-present)
IEEE Transactions on Automation Science and Engineering (2021-2026)
Journal of Simulation (2021-present)
IEEE/SICE International Symposium on System Integration (2017-2021)
- Guest Editor:
Flexible Services and Manufacturing Journal (special issue)
Mathematics (special issue)
Journal of Simulation (special issue)
- Conference Proceeding Editor:
Winter Simulation Conference (WSC) 2024
- Journal Reviewer:
IEEE Transactions on Automatic Control
Automatica
Operations Research
Management Science
IEEE Transactions on Pattern Analysis and Machine Intelligence
INFORMS Journal on Computing
Production and Operations Management

IEEE Transactions on Automation Science and Engineering
European Journal of Operational Research
IIESE Transactions
ACM Transactions on Modeling and Computer Simulation
International Journal of Production Research
Naval Research Logistics
Annals of Operations Research
Transportation Research Part C
Operations Research Perspectives
Journal of Simulation
Flexible Services and Manufacturing Journal
IEEE Access
IEEE Robotics and Automation Letters
IEEE Systems Journal
IEEE Transactions on Systems, Man and Cybernetics: Systems
IEEE Transactions on Engineering Management
Computers & Operations Research
Asia-Pacific Journal of Operational Research
Methodology and Computing in Applied Probability
BMC Health Services Research
International Journal of Simulation and Process Modeling
Simulation: Transactions of The Society for Modeling and Simulation International

- Conference Co-chair/Program Co-chair:
 - Winter Simulation Conference (WSC) 2022
 - NSFC-RGC Conference on Frontiers of Industrial Big Data and Intelligent Systems 2023
 - NSFC-RGC Conference on Frontiers of Digital Twins in Intelligent Manufacturing and Smart Cities 2025
- Conference Track Coordinator:
 - Winter Simulation Conference (WSC) 2022-2026
 - INFORMS Conference on Service Science (ICSS) 2021
 - IFAC Conference on Manufacturing Modeling, Management and Control (MIM) 2019
- Conference Program Committee:
 - INFORMS International Meeting 2025
 - Winter Simulation Conference (WSC) 2021-2025
- Community Service:
 - I-Sim Membership Committee (chair) 2022-present
 - I-Sim Council 2026-2028
- Award Committee:
 - INFORMS Conference on Service Science Best Student Paper Award 2026
 - INFORMS Service Science Best Student Paper Award 2020-2023
 - Winter Simulation Conference PhD Colloquium Best Paper Award 2021-2024
 - Winter Simulation Conference Best Poster Award 2022
 - POMS-HK International Conference Best Student Paper Competition 2018-2020
- Conference Session Chair/Reviewer:
 - International Conference on Learning Representations (ICLR)
 - International Conference on Machine Learning (ICML)
 - Conference on Neural Information Processing Systems (NeurIPS)
 - ACM SIGKDD Conference on Knowledge Discovery and Data Mining
 - Annual Meeting of the Association for Computational Linguistics (ACL)
 - Winter Simulation Conference (WSC)
 - IEEE Conference on Automation Science and Engineering (CASE)
 - INFORMS Annual Meeting
 - INFORMS Conference on Service Science (ICSS)
 - IEEE Conference on Decision and Control (CDC)
 - American Control Conference (ACC)
 - International Conference on Logistics and Maritime Systems (LOGMS)

IEEE/SICE International Symposium on System Integration (SII)
IEEE International Conference on Industrial Technology (ICIT)
North American Manufacturing Research Conference

University Service

- Associate Head of Systems Engineering Department, 2023-present
- University Senate, 2019-2023
- College Board of Engineering, 2018-present
- College Research Committee, 2021-present
- Search Committee for Appointment of Head of Department ADSE, 2021-2022
- Departmental Staffing Committee, 2017-2018, 2020-2023, 2026-present
- Departmental Undergraduate Program Leader, 2021-2023
- Departmental Master Program Leader, 2018-2021
- Departmental Master Program Deputy, 2016-2018
- Departmental Engineering Doctorate (Chinese) Program Leader, 2024-present
- Departmental Scholarship Coordinator, 2015-2020
- Student Exchange Coordinator, 2018-2020

MEMBERSHIP

- Senior Member, Institute of Electrical and Electronics Engineers (IEEE)
- Member, Institute for Operations Research and the Management Science (INFORMS)
Simulation Society, Optimization Society, Service Science Society
- Member, POMS Hong Kong Chapter