Renlong WANG

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Hint: Full publications and preprints are available at personal website.

Education

University of Chinese Academy of Sciences Beijing, China
Master of Industrial Engineering; GPA: 3.79/4.00 *Sep. 2023 – Jun. 2026*

- Major Courses: Operations Research; Stochastic Operations Research; Convex Analysis and Optimization; Applied Statistics; Optimization: Model, Theory and Algorithm (Ph.D. Level course)
- Excellent Prize for the President Scholarship of Chinese Academy of Sciences (2025, Top 1%)
- National Scholarship for Postgraduates (Master) (2024, Top 1%)

Nanjing Tech University Nanjing, China
Bachelor of Civil Engineering; GPA: 3.69/4.00 *Sep. 2019 – Jun. 2023*

- Distinguished Graduates in Civil Engineering from Jiangsu Universities and Colleges (2023)

Awards

[1] Outstanding Winner Prize of American Undergraduate Mathematical Contest in Modeling (2022).
  – Top 0.16% among 27,205 teams, America's highest award for mathematical contest in modeling.

[2] SIAM Award of American Undergraduate Mathematical Contest in Modeling (2022).
  – Six teams worldwide designated by The Society for Industrial and Applied Mathematics (SIAM).

[3] National First Prize of Chinese Undergraduate Mathematical Contest in Modeling (2021).
  – Top 0.65% among 45,075 teams, China's highest award for mathematical contest in modeling.

Research Experience

Preference Robust Optimization *Jun. 2024 - Present*

- Proposed Distributionally Preference Robust Choice-Based Discrete Planning considering utility preference ambiguity based on random utility theory (see WORK-IN-PROGRESS [1], with Yifan Hu).
- Proposed Globalized Preference Robust Optimization for group decision-making under potential model misspecification, which covers traditional preference robust counterpart and preference robust satisficing counterpart (see WORK-IN-PROGRESS [2], sole author).

Optimization-Based Multi-Attribute Group Decision-Making *Apr. 2023 - Present*

- Proposed Preference Robust Ordinal Priority Approach (OPA-PR) to address the parametric uncertainty, preference ambiguity, and model misspecification (see PUBLICATION & PREPRINT [4], sole author).
  – Developed OPA-PR based on a two-stage optimization framework that accounts for the parametric and preference ambiguity, with a piecewise linear approximation of utility functions for tractable reformulation.
- Proposed Generalized Ordinal Priority Approach (GOPA) with incomplete preference learning for the deterministic decision-making (see PUBLICATION & PREPRINT [7], sole author).
  – Introduced GOPA based on an "estimate-then-optimize" bilevel optimization framework under incomplete preference information, with the lower-level focusing on preference learning via minimum relative entropy utility estimation and the upper-level optimizing decision weights.
  – Derived Closed-form solutions for both the lower and upper-level problems, accompanied by an analytical algorithm for implementing the original bilevel framework.
  – Analyzed the decomposability of the closed-form solution and the sensitivity boundaries concerning constraint perturbations, ranking parameters, and alternative utilities.
- Proposed Group Consensus Ordinal Priority Approach (OPA-GC), offering theoretical foundation for expert consensus modification based on its information distribution (see PUBLICATION & PREPRINT [8], sole author).
- Proposed Partial Ordinal Priority Approach (OPA-P) to consider Pareto optimality, providing theoretical grounding for partially ordered transformation (see PUBLICATION & PREPRINT [9] and [5]).

Publications & Preprints (in chronological order)

[1] **Wang, R.**, Yue, J., Gao, M.*, Huynh, ANQ., & Lu, J., Dynamic Metanetwork-Based Risk Analysis Framework under Prospect Theory for Emergency Response Performance Assessment with Procedure Dependency and Organization Collaboration, under second-round review of *Risk Analysis* (major revisions of 1st round), 2025 (First author).

- Oral presentation at *2023 International Symposium on Emergency Management*, Wuhan, China, August 10-12 (**Best Paper Third Prize**).

[2] Cui, S., Zhu, F., **Wang, R.***, Nuclear Energy Technology R&D Portfolio Selection under Scenario Uncertainty: Distributionally Robust Ordinal Priority Approach, under second-round review of *Expert System with Applications* (major revisions of 1st round), 2025 (Correspondence author).

[3] **Wang, R.**, Li, L., Lin, W., Wang, E., Yuan, J., Mastering the Complexity: A Cellular Automata-Based Framework for Simulating Resilience of Hospital Power-Water-Firefighting-Space Nexus System, accepted by *Simulation Modelling Practice and Theory*, 2025 (First Author).

[4] **Wang, R.**, Preference Robust Ordinal Priority Approach with Preference Elicitation under Incomplete Information for Multi-Attribute Robust Ranking and Selection, under first-round review of *Computers & Industrial Engineering*, 2025 (Sole author).

- Oral presentation at *2024 International Symposium on Emergency Management*, Nanjing, China, November 8-10 (**Best Paper First Prize**).
- Oral presentation at *2024 University of Chinese Academy of Sciences Graduate Student Forum-Academic Subforum on Economics and Management*, Beijing, China, December 14-15 (**Excellent Paper Award**).

[5] **Wang, R.**, Shen, R., Cui, S., Chi, H., Shao, X., & Gao, M.*, Multi-Attribute Decision-Making for Improvisational Emergency Supplier Selection: Partial Ordinal Priority Approach, accepted by *Expert System with Applications*, 2025 (First Author).

- Oral presentation at *2023 POMS Summer School in China*, Dalian, China, August 9-14 (**Excellent Paper Prize**).

[6] Cui, S., **Wang, R.***, Li, X., & Bai, X.*, Policy-Driven Analysis of Carbon Emission Efficiency under Uncertainty and its Application in Chinese Industry: Hybrid Delta-Slacks-Based Model and Ordinal Priority Approach, accepted by *Energy*, 2025 (Correspondence Author).

[7] **Wang, R.**, Generalized Ordinal Priority Approach with Personalized Incomplete Preference Learning for Multi-Attribute Decision-Making, under first-round review of *Annals of Operations Research*, 2025 (Sole author).

- Oral presentation at *2024 POMS Summer School in China*, Dalian, China, August 19-26 (**Excellent Paper Prize**).

[8] **Wang, R.**, A Hybrid MADM Method Considering Expert Consensus for Emergency Recovery Plan Selection: Dynamic Grey Relation Analysis and Partial Ordinal Priority Approach, published in *Information Sciences*, 2024 (Sole author).

[9] **Wang, R.**, Shen, R., Chi, H., & Gao, M.*, Partial Ordinal Priority Approach in Multi-Attribute Decision-Making, accepted by *Chinese Journal of Management Science (in Chinese)*, 2024 (First author).

[10] **Wang, R.**, Cui, S., & Gao, M.*, Systematic Scenario Modeling for Priority Assessment of Sustainable Development Goals in China under Interaction and Uncertainty, published in *Environment, Development and Sustainability*, 2024 (First author).

Work-in-Progress

[1] Distributionally Preference Robust Choice-Based Discrete Planning (with Yifan Hu).

[2] Globalized Preference Robust Optimization under Model Misspecification (Sole author).

Professional Service

Review Services

- *Chinese Journal of Management Science (In Chinese)* (2024: 2 times, 2025: 1 time).
- *Transportation Research Part E: Logistics and Transportation* (2023: 1 time).