

# Xiangyu Ma

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Faculty of Infrastructure Engineering, Dalian University of Technology, Dalian, China

## OBJECTIVE

Graduate student looking for Ph.D. positions starting from Fall 2024.

## EDUCATION

### Dalian University of Technology

Dalian, China

Degree: Master

GPA: 3.70/4

Sep 2021 - Present

Major: Hydrology and Water Resources

Advisor: Associate Prof. Shengli Liao

Dissertation: Research on the Water-Energy-Ecosystem Nexus and Multi-objective Optimization and Decision-making Analysis in Hydro-based Power System

Core Courses: Optimization Method, Mathematical Statistics, Water Resource System Analysis, Risk Analysis and Control, Operation Theory about Electricity Power and Hydropower Systems, Principle of System Engineering

### Dalian University of Technology

Dalian, China

Degree: Bachelor

GPA: 3.26/4

Sep 2017 - Jun 2021

Major: Water Conservancy and Hydropower Engineering

Dissertation: Power Generation Scheduling of Cascade Hydropower Stations in Lancang River under Electricity Market Environment

Core Courses: Engineering Hydrology, Water Resources Planning and Utilization, Hydropower and New Energy, Economic Operation of Hydropower Stations, Basics of Water Informatics, Hydropower Information System and Database, Environmental Hydro Science

## RESEARCH EXPERIENCE

### Research on the Water-Energy-Ecosystem Nexus in hydro-based power systems

Apr 2023 - Present

- Establishing a multi-timescale two-layer nested framework to explore the Water-Energy-Ecosystem Nexus in hydro-based power systems .
- The outer layer consists of a long-term river basin-wide multi-objective optimization model, considering objectives such as water supply, hydropower generation, shipping, and sub-daily hydrological regime (hydropeaking).
- The inner layer consists of a scenario-based stochastic programming model for multiple grids peak shaving operation under uncertainty originating from variable renewable energy, with an hourly resolution.

### Research on multi-objective decision analysis for hydropower system

Aug 2022 - Mar 2023

- Constructing a short-term multi-objective mixed integer linear programming (MILP) model integrating multiple uses of hydropower reservoirs, including peak shaving, ship navigation, and power generation.
- Developing a solution and decision-making framework based on Normalized Normal Constraint (NNC) and TOPSIS methods to obtain Pareto solutions and coordinate multi-sector performance.

### Research on multi-objective co-scheduling of giant and re-regulation reservoirs

Feb 2022 - Jul 2022

- Employing constraint aggregation and hexahedron gridding strategies to handle high-dimensional non-convex and nonlinear constraints in hydropower operation and improve solution efficiency.
- Establishing a multi-objective optimization model based on Normal Boundary Intersection (NBI) and MILP to analyze and mediate the conflict between peak shaving and shipping.

### Practice of basic methods in water resources system (Python)

Sep 2021 - Jan 2022

- Optimization methods for reservoir optimal operation: Genetic Algorithm (GA), Dynamic Programming (DP), Non-dominated Sorting Genetic Algorithm II (NSGA-II), etc.
- Machine learning methods for runoff forecasting : Artificial Neural Network (ANN), Support Vector Regression (SVR), Seasonal AutoRegressive Integrated Moving Average (SARIMA), etc.

## PUBLICATIONS

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**Xiangyu Ma**, Shengli Liao, Benxi Liu, Hongye Zhao, Chuntian Cheng, Huaying Su. **Multi-objective solution and decision-making framework for coordinating the short-term hydropeaking-navigation-production conflict of cascade hydropower reservoirs**. Journal of Cleaner Production. 2023. 422:138602. (JCR Q1, IF=11.1)

Shengli Liao, Huan Wang, Benxi Liu, **Xiangyu Ma**, Binbin Zhou, Huaying Su. **Runoff forecast model based on an EEMD-ANN and meteorological factors using a multicore parallel algorithm**. Water Resources Management. 2023. 37(4). 1539-1555. (JCR Q1, IF=4.3)

Shengli Liao, Hualong Yang, Benxi Liu, Hongye Zhao, Huan Liu, **Xiangyu Ma**, Huijun Wu. **Daily peak-shaving model of cascade hydropower serving multi-grids considering an HVDC channel shared constraint**. Renewable Energy. 2022. 199. 112-122. (JCR Q1, IF=8.7)

Huijun Wu, Shushan Li, Hongbing Tang, **Xiangyu Ma**, Xi Zhang, Shengli Liao. **MILP method for multi-objective short-term optimization scheduling of cascaded hydropower stations coupling peak-shaving and navigation demands**. Electric Power Automation Equipment, 2023. (EI, in Chinese)

## HONORS AND AWARDS

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<b>Excellent Graduate of Dalian University of Technology</b> Top 5%, Dalian University of Technology	Sep 2023
<b>First Prize Scholarship of Dalian University of Technology</b> Top 5%, Dalian University of Technology	Sep 2023
<b>Second Prize Scholarship of Dalian University of Technology</b> Top 20%, Dalian University of Technology	2021 - 2022
<b>Third Prize in Structural Design Competition of Dalian University of Technology</b> Top 20%, Dalian University of Technology	Jun 2019

## SKILLS

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<b>Languages</b>	Chinese (native speaker), English (IELTS, 7.0)
<b>Programming</b>	Python, MATLAB, C, R
<b>Software</b>	Gurobi (Optimizer), ArcGIS, Adobe Illustrator, Origin
<b>Python Packages</b>	Geatpy (Evolutionary Algorithm), Scikit Learn, Geopandas, etc
<b>Typesetting</b>	MS office, Latex, Markdown