

Puhantong(Rae) Rong

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RESEARCH INTERESTS

Operations research, optimization modeling, algorithm design, data-driven decision-making.

EDUCATION

University of Washington

Sep. 2025 – Present

Major: MS in Applied and Computational Mathematics

- **Courses:** Markov Decision Processes, Linear Optimization Models in Engineering, Integer Programming, Scientific Computing, Applied Complex Analysis, etc.

Xi'an Jiaotong-Liverpool University

Sep. 2021 – Jul. 2025

Major: BSc in Applied Mathematics

- **Courses:** Analysis, Advanced Linear Algebra, Abstract Algebra, Topology, Functional Analysis, Operations Research, Numerical Analysis, Optimization Theory, etc.

RESEARCH EXPERIENCE (SELECTED)

The Theory of Lebesgue Integration


Sep. 2024 - June. 2025

Undergraduate Capstone Project Supervisor: [Dr. Luca Demangos](#) 

- Gained a solid foundation in Measure Theory, including the Lebesgue measurable set, Lebesgue measurable function, Lebesgue Integration, and the L^p spaces, etc.
- Developed the skills of identifying specific examples, such as a set which is Lebesgue measurable but not Borel, and providing proof of famous theorems, including Egoroff's Theorem, the Monotone Convergence Theorem, and the Dominated Convergence Theorem, etc.

Data-Driven Research on Operation Research

Sep. 2024 - Nov. 2024

Student Researcher Supervisor: [Dr. Yu Yang](#) 

- Analyzed the real-world data provided by Meituan; visualized the distribution of merchants, couriers and customers as well as a complete trace of each courier with Python.
- Investigated the orders' refusal issue by couriers through literature review and established the model to predict the probability of refusal rate. Found the optimal route planning model of couriers to meet the requirements of customers, couriers and merchants with minimal effort.

Classical Differential Geometry of Curves and Surfaces

Jun. 2024 - Nov. 2024


Student Researcher Supervisor: [Dr. Yuhang Liu](#) 

- Probed into the theories of classical differential curves, including the fundamental theorem of local curve theory and some applications of Frenet–Serret formulas. Derived the local canonical form of curves by applying Taylor expansion; further concentrated on Cauchy Crofton Theory and most applications.
- Investigated extensively the formation and properties of differential surfaces, including regular surfaces, compact orientable surfaces, and the geometry of the Gauss Map, etc.

Research on Three-Dimensional Object Representations

Jun. 2023 - Aug. 2023


Student Researcher Supervisor: [Dr. Kun Zhang](#)  [Dr. Feiyan Chen](#) 


- Acquired comprehensive knowledge of Bezier, B-spline, NURBS and T-spline curves; deduced and proved several key mathematical properties and theorems.
- Conducted advanced dynamic simulations to visualize the formation processes of both Bezier and B-spline surfaces and elucidated the geometric principles underlying T-spline surface formation, with applications in autonomous driving path planning and engineering design. Summarized research methodologies and key findings in an [academic poster](#) , demonstrating strong analytical, technical, and communication skills.

COURSE PROJECT (SELECTED)

Linear Programming in University Course Scheduling

Apr. 2024 - May 2024


Team Member Supervisor: [Dr. Min Wen](#) 

- Developed a linear programming model to minimize the total travel distance for students on a weekly basis. Incorporated constraints including a fixed number of classrooms and limited scheduling times.
- Applied the Simplex algorithm, utilizing Cplex and Java for implementation and optimization. Summarized research methodologies and key findings in an [academic poster](#) .

COMPETITIONS(SELECTED)

Pricing and Replenishment Model Based on Time Series Analysis and Linear Programming

Sep. 2023

2023 China Undergraduate Mathematical Contest in Modeling(CUMCM) Supervisor: [Dr. Fajin Wei](#) 

- Proposed a model to maximize the supermarket revenue by determining daily replenishment volumes and pricing strategies for each vegetable category based on sales data.
- Developed a time series model to analyze the sales volume of each category over time and its correlation with cost-plus prices.
- Incorporated additional factors such as sales fluctuations, seasonal influences, transportation losses, store discounts, and display space; adjusted the model to account for these variables.

Impacts of Light Pollution and Mitigation Measures

Feb. 2023

2023 MCM/ICM Supervisor: [Dr. Fajin Wei](#) 

- Developed a three-level evaluation metric for light pollution, using the Entropy weight method, TOPSIS method, and K-means method, to assess light pollution risk at specific locations.
- Established a model using the least squares method to quantify the relationship between light pollution levels and their various impacts, adjusting model parameters for accuracy.
- Proposed mitigation strategies based on analysis results, including the use of energy-saving materials, to reduce reflective surfaces and raise public awareness of light pollution.

SKILLS & INTERESTS

Skills: Julia, Python, Matlab, LaTeX.

Interests: piano, table tennis.

Motto: The best time to plant a tree was 20 years ago. The second-best time is now.