

# Shengyuan Wang

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## Education

### Macalester College, St. Pual, MN

B.A. Expected May. 2024

MAJOR GPA: 4.0/4.0

Mathematics, C.S.

- Charles J. Turck Presidential Honor Scholarship and Kofi Annan Scholarships (Four-year scholarship)
- School Dean's List (2021 - PRESENT)
- Admission to Honors Program

## Skills

**Language** R, Python, Java, Go, C/C++, SQL, PHP, JavaScript

**Database** MySQL, Oracle, MongoDB, XML Query, Neo4j, Redis

**Tools** AWS EC2, Docker, Jupyter, Git, Flask, Linux

**Other** NumPy, Pandas, NLTK, Pytorch, TensorFlow, OpenCV, Latex, Vue, HTML5, CSS, jQuery, Shell, NodeJS, Angular

## Research Interest

My focus is on leveraging Artificial Intelligence (AI) and Natural Language Processing (NLP) in the medical field. I aim to develop advanced NLP models to extract meaningful information from medical text data like electronic health records and clinical notes, enabling accurate diagnoses and personalized treatment plans. Additionally, I'm interested in integrating AI-driven NLP solutions into clinical workflows to provide evidence-based recommendations, leading to improved patient care and reduced errors. My research also addresses ethical considerations to ensure patient privacy and algorithmic fairness in healthcare AI applications.

## Research Experience

### Honors Research

MN, U.S.A

Advised by Susan Fox, MACALESTER COLLEGE

May. 2023 - PRESENT

- Developed an automated system for brain tumor detection and classification using deep learning algorithms, including Convolutional Neural Network (CNN), Artificial Neural Network (ANN), and Transfer Learning (TL).
- Utilized Python programming language and deep learning frameworks such as TensorFlow, Keras, and PyTorch to train the system on a dataset of brain tumor MRI images, preprocessed for noise removal and normalization.
- Evaluated the system's performance in terms of accuracy, sensitivity, specificity, and precision, comparing it to manual classification by radiologists and demonstrating its potential to reduce human errors and improve diagnostic accuracy.

### Research

MN, U.S.A

Advised by Susan Fox, MACALESTER COLLEGE

Sept. 2022 - Jan. 2023

- Explored the use of Proportional, Integral, and Derivative (PID) controllers for their simplicity, ease of implementation, and robustness in various applications.
- Developed a technique to obtain the First Order System with Time Delay (FOPDT) model for performance comparison of PID controllers.
- Conducted a comprehensive study comparing open-loop and closed-loop tuning techniques with the Internal Model Control (IMC) technique for PID controllers in setpoint tracking and disturbance rejection scenarios.

### Research

CA, U.S.A

Felidae Conservation Fund

Feb. 2023 - PRESENT

- Migrate images into a new paradigm and stiched with MegaDetector to generate species-level annotation
- Improve species detection models to enhance the performance of sorting the list of species
- Integrate high-level insights directly into website, freeing researchers to focus on deeper, more nuanced questions.

### Research

Beijing, China

Institute of Computing Technology, Chinese Academy

May. 2021 - Sept. 2021

- Developed a novel Loss function called "Loss with Outlier Identifier (LOI)" for Machine Learning applications, designed to enhance the robustness of prediction loss calculations.
- Incorporated interdisciplinary techniques to leverage the strengths of existing algorithms while mitigating their limitations, resulting in a more effective and efficient approach.
- Introduced two additional free parameters to ensure the continuity and differentiability of LOI at all points, enabling easy minimization using the Gradient Descent algorithm without extra training requirements.

## Work Experience

### Welight Tech

MN, U.S.A

CTO

May. 2023 - PRESENT

- Founding Member of WeLight Tech, an edtech startup using AI to streamline the study abroad application process for high school and undergraduate students.
- Led full-stack development and AI model construction
- Coordinated weekly engineering team meetings and oversaw hiring.

## NetEase Game

Software Engineer

NY, U.S.A

May. 2022 - Oct. 2022

- Design and deliver mobile NetEase Music browser feeds and competition activity web application
- Contribute to team's component library: encapsulated Toast and Modal components with customized hooks
- Optimized team's Webpack scaffold, resulting in reducing CSS bundle-size by 35% and time deduction for CICD
- Participate in React 18 upgrading plan and run a demo with React Server Components, reducing 30% FTP web vitals in the experimental grey testing environment.

## FIRA ROBO Organization

Software Developer

MN, U.S.A

May. 2020 - Sept. 2021

- Designed competition registration and score-recording system backend with PHP and MySQL, supporting current data flow of over 2000 user usage and score-recording of all 43 competition categories
- Constructed concurrency-safe network flows and remote servers with LAMP for online competition during Cov19
- Worked with tables from Oracle/MySQL/PostgreSQL database with Python, Performed cleansing operation on data generated from web logs with automated scripts in Python
- Parsed XML documents using Python Scripts and load into database. Daily PostgreSQL database maintenance and Worked on back-end and front-end feature

## Publication / Preprints

### Improvements To Naive Loss Functions With Outlier Identifiers

Shengyuan Wang, Qizhe Gao, Yifei Jiang

Achieve superior model training with LOL: A continuous, derivable function utilizing two free parameters, optimizing performance without extra training efforts.

### An Optimal Trading System based on LSTM and Dynamic Programming

Shengyuan Wang, Yixiao Wang, Yulin Shao

The trading model combines ARIMA for long-term trends, LSTM for short-term fluctuations, Markowitz Model for optimized asset allocation, and Dynamic Programming for maximizing investment returns.

### Performance Comparison of OpenMP and OpenACC in Floyd Warshall Algorithm

Shengyuan Wang, Kaiyang Yao

Speeding up problem-solving: A comparative study of three parallel architectures (OpenMP, OpenACC-GPU, and OpenACC-CPU) for Floyd-Warshall algorithm

### Study on PID Control Design and Electric Kettle Simulation

Shengyuan Wang

Enhancing PID controllers: Comparing tuning techniques for setpoint tracking and disturbance rejection using FOPDT model. Optimizing PID control: IMC-based tuning compared with open loop and closed loop techniques for improved performance.

## Teaching Experience

### COMP123 Introduction to Computer Science

Teaching Assistant

Macalester College

Fall 2021 - Spring 2022

- Design and write code implementations for homework and class materials
- Help students with their projects based on their proposals

### COMP 221 Algorithm Design and Analysis

Teaching Assistant

Macalester College

Fall 2022 - Spring 2023

- Design and write code implementations for homework and class materials
- Prepare class notes and expand knowledge on algorithms

### COMP 445 Parallel and Distributed Processing

Teaching Assistant

Macalester College

Fall 2023 - Present

- Design and write code implementations for homework and class materials
- Prepare class notes and assist students writing papers

## Honors & Awards

2023	<b>Silver Prize</b> , ICPC Regional Contest	MN, U.S.A
2022	<b>Finalist</b> , Mathematic Contest In Modeling (MCM)	WI, U.S.A
2022	<b>First Place</b> , Macalester Local Programming Contest	MN, U.S.A
2022	<b>Bronze Prize</b> , ICPC Regional Contest	MN, U.S.A
2021	<b>First Place</b> , Macalester Local Programming Contest	MN, U.S.A
2020	<b>Gold medal</b> , FIRA ROBO All-Round U19	Liaoning, China
2020	<b>Gold medal</b> , FIRA Data Analysis Challenge U19	Liaoning, China
2020	<b>Gold medal</b> , FIRA Programming Challenge U19	Liaoning, China