

# Wang, Jie

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May 2023

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## EDUCATION

**Zhejiang University (ZJU-UIUC Institute)**

BSc. Computer Engineering (GPA: 3.81/4.0)

Haining, Zhejiang, China

Aug 2020 – Jun 2024

**University of Illinois at Urbana-Champaign (Engineering College)**

BSc. Computer Engineering (GPA: 3.82/4.0)

Urbana, IL, U.S.

Aug 2022 – Jun 2023

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## RESEARCH EXPERIENCE

**ZJU SRTP, Simulation and modeling of unmanned vehicle safety test based on Apollo D-kit** Haining, Zhejiang  
*Research Assistant, Transport Systems & Environment Lab* Mar 2021 – May 2022

- Used Python to deal with Waymo Data set, data cleaning and RNN network construct to gather the real-road statistic information, analyzed and recorded the common traffic states of unmanned vehicles.
- Constructed the high-resolution Lidar map of ZJU international campus via Apollo D-kit Self-driving car produced by Baidu.
- Proposed a more realistic perception range model for Connected and automated vehicles in traffic state Estimation Based on present data and previous research.

**Open-source Software Community Practice and Effectiveness Research**

Hangzhou, Zhejiang

*ZJU Summer Research Assistant*

Jun 2022 – Oct 2022

- Used a series of software analysis tools such as Designite, Structure101 and SonarQube to analyze 40 software projects. Summarized the common architectural antipattern like Cyclic Dependency, Ambiguous Interface, and Scattered Functionality, recording possible reason and method to reconstruct the code into better architecture.
- Collected 20 Java projects and 20 C/C++ projects as tool detection data sets. For the C/C++ project, we collected the source of the OpenEuler open-source operating system code, and a variety of open source embedded system source code. 20 Java projects were selected from Apache Software Foundation Distribution, involving Big data, network services, network framework and other fields.
- Combined git-version record with historical source code to compare the architectural improvement and technique debt of them. Evaluated the performance of different tools.
- Produced an academic poster Architectural Antipatterns Research Based on Software Engineering, joining the competition after the end of 2022 summer research program.

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## COURSEWORK

**CS438: Communication Networks Mini project**

Urbana, IL

*Student, Team leader in a three-person group*

April 2023 – May 2023

- Developed an open-source, Python tool for comprehensive wireless network analysis, with emphasis on Wi-Fi access points roaming mechanisms and signal strength heatmap generation.
- Designed a procedure-oriented data pipeline architecture including coordinate construction, data collection, data preprocessing, heatmap generation, and individual AP analysis.
- Applied the tool on UIUC Thomas M. Siebel Center, analyzed campus network AP roaming mechanisms and generated signal strength distributions heatmap.
- Collaborated with the UIUC IT Network team to apply project learnings to real-world environments, providing a series of observations and suggestions for campus network improvements.
- Achieved full grade on this extra credit project.

**ECE391: Computer Systems Engineering Implementation**

Urbana, IL

*Student, Teammate in a four-person group*

Oct 2022 – Dec 2022

- Constructed a Linux-like operating system kernel with C, having basic function such as paging virtual memory, fully functional IDT, GDT and i8259-based interrupt controller, etc.
- Constructed a read-only file system, operating device driver such as Real Time Clock, keyboard and Programmable Interval Timer.
- Used x86 to establish the system call linkage between user-level program and kernel, passed all test cases provided by the course. Furthermore, realized single CPU task scheduling and multiple terminals switching.
- Received 99.5/100 for the overall 5-checkpoints project.

**Math286: Mathematical Experiments and Mathematical Software Practice**

Urbana, IL

**Group Leader in A Four-person Group**

Mar 2022 – May 2022

- Used MATLAB and Python to analyze two set of two initial value problems, using a combination of numerical and analytical methods to determine the maximal solutions.
- Subdivided the problem into vector-field based asymptote analysis, power series solutions, Euler method, Runge-Kutta method and Picard-Lindelöf-Iteration etc.
- Dealt with different internal theoretical failure and bug of the numerical methods, including vibration, over-fitting and overflow.
- Applied error analysis to every method, comparing the performance using different parameters such as step size. The outcome was verified to be precise within 0.01%, and the report received 97/100 in the final evaluation.

**CS225: Data Structure and Algorithm – Simplified Vaccination Registration System Development**

Haining

**Group Leader**

Mar 2022 – May 2022

- Used C++ to construct a simplified vaccination registration system database, including key structures such as double linked-list, Fibonacci heap, B tree, B+ tree, and Hash table.
- All input data are modified based on real database and are highly creditable.
- Realized the first edition of database using Fibonacci heap, then speeded up its performance by implementing B tree and B+ tree to hold the key and value. The system is capable of CRUD (create, read, update, delete), having command-line GUI. System can produce the necessary weekly and monthly report in mark-down form.
- Designed the whole system architecture with three other fellow students. Led teamwork together to finish this complex computing assignment, receiving full mark on the two checkpoints.

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**ACADEMIC CONTESTS**

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**2022 International Mathematical Contest in Modeling (Honorable Mention)**

China

**Group Leader**

Feb 2022

- Established two robust, high-performance mathematical models to in an attempt to help mitigate the Colorado River water crisis in the United States based on real historical data record and theoretical feasible assumptions.
- Discretized time to construct a water-hydropower supply model using the idea of dynamic programming.
- Used Monte-Carlo method to produce the water-electricity allocation plan, considering aspects from agriculture, industry, energy, mining, wildlife and tribal.
- Used SPSS time series analysis tool to predict the weight vector of each state water-need data. Did optimization on the two models, produced demand matrix for the two-dam system.
- Performed sensitivity analysis on the model, demonstrating the strategy of solving conditions such as water resource shrinkage fastened, renewable energy technologies involved, and conservation measures applied.
- Evaluated the overall model strengths and weaknesses, taking further discussion on the possible improvement and modification.

**2023 Shell Eco-marathon Autonomous Programming Competition**

U.S.

**Group Member**

March 2022

- Joined the EV-concept team to participate in the competition, which aims to develop path planning, perception, and control algorithms for simulation autonomous vehicles using the Robot Operating System (ROS).
- Utilized the CARLA simulator with the Unreal Engine to test our code in a simulated environment, with the goal of achieving the most efficient path planning according to the competition's ranking criteria.
- Modified and improved the example ROS stack provided by the competition organizers to perform effectively in the real-world simulation environment within CARLA, focusing on the development of path planning, perception, and control algorithms.

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**EXTRACURRICULAR ACTIVITIES**

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Director of Academy, ZJUICMUN

Feb 2021 – Jun 2022

Key member of the Propaganda Department, ZJU International Campus Student Union

Oct 2020 – Present

Commissary in charge of publicity, ECE2001 Class

Sep 2020 – Present

Key member, Aroma Coffee Club at ZJU International Campus

Oct 2021 – Present

Member, Poita Art Club at ZJU International Campus

Oct 2021 – Present

Member, HEMA Club at UIUC

Oct 2022 – Present

Member, Philosophy Club at UIUC

Oct 2022 – Present

Member, EV concept at UIUC

Feb 2023 – Present

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**LANGUAGES AND SKILLS**

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**Languages:** Mandarin (native)

English – Test Scores: TOEFL 102

Duolingo 125

**Computer:** C (proficient), C++ (proficient), Python(proficient), MATLAB (basic), LC-3(proficient), x86(basic)  
ROS (basic), Carla(basic)  
Photoshop (basic), Lightroom(proficient), Premiere Pro(basic)

**Hardware:** Circuit Board Analysis and Assembly, STM32 Programming and Assembly, Arduino UNO  
Programming and Assembly, Apollo D-kit Autonomous Test Vehicle Assembly