

# Junyan Bai

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## EDUCATION BACKGROUND

University of Illinois Urbana-Champaign

*Bachelor of Science*

URBANA, IL

Sep 2022 - Jun 2026

*Major: Electrical and Computer Engineering*

**Core Courses:** Control Systems, Computer Systems Engineering, Artificial Intelligence, Probability with Engineering Application, Analog Signal Processing, Electronics, Computing, Data Structures, Numerical Methods.

**Cumulative GPA: 3.97/4.0**

## RESEARCH EXPERIENCES

Research Assistant

Human-Centered Autonomy Lab@UIUC

Champaign, Illinois

Principle Investigator: Prof. Katie Driggs-Campbell

Project Lead

University of Illinois Urbana-Champaign

Champaign, Illinois

*Project: Reaction Wheel Pendulum (RWP) System Control and Analysis*

- Design a system with a rotor and a pendulum, and measure their relative encoding angles.
- Calculate real angles based on the measured relative angles using specific mathematical relations.
- Implement control strategies, including a PD controller for two-state and three-state feedback, and an observer controller.
- Analyze the system's performance through simulations, applying torque to achieve equilibrium positions.
- Lead in implementing control algorithms, mathematical modeling, and performance analysis.

Operating System Developer

University of Illinois Urbana-Champaign

Champaign, Illinois

*Project: Development of a Unix-like Operating System*

- Develop the core of an operating system with Unix-like features: virtual memory, process, and virtio.
- Implement a filesystem that supports basic file operations and program loading.
- Create system calls for process management, I/O operations, and other functionalities like file manipulation.
- Support multitasking via features like process forking, locks, and preemptive multitasking.

Research Assistant

Nanjing University

Nanjing, China

*An Empirical Study on the Interaction between RMB Exchange Rate and Real Estate Price*

- Developed skills on implementing linear regression computing software
- Learnt basic concepts about writing thesis

Research Assistant

Nanjing University

Nanjing, China

*Research on Volatility of China INE Crude Oil Futures Based on GARCH Family Model*

- Implemented AR-GARCH model for analysis on multiple related databases

Independent Researcher

University of Illinois Urbana-Champaign

Champaign, Illinois

*Project: AM Radio Receiver Building*

- Enhanced basic analysis and calculation of circuits
- Developed skills on mathematical operations in analog computers and overall circuits building

## EXTRACURRICULUM ACTIVITIES

RM 2023

Shenzhen China

- Attended the 2023 RM competition as an informal team member of Illini RM

IRM RSO

Champaign, Illinois

- Joined Illini RoboMaster student organization and participated in weekly activities

## SKILLS

**Computer Skills:** Java (Advanced), Python (Intermediate), C++ (Advanced), C (Advanced), LC-3 Assembly Language (Advanced), Adobe Photoshop (Basic), Adobe Dreamweaver (Basic)

**Languages:** Mandarin (Fluent), Cantonese (Intermediate), Español (Basic), Japanese (Basic)