

# Zhicheng Xu

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## EDUCATION

### East China Normal University - ECNU

Shanghai, CHN

- Bachelor of Science in Geographic Sciences
- Non-degree Artificial Intelligence and Math Program
- GPA: 3.53/4.0, Average Score: 87 /100

Sept 2021 - Jun 2025  
Sept 2024 - Jun 2025

### Georgia Institute of Technology

Atlanta, GA, USA

- M.S. in Geographic Information Science & Technology

Aug 2025 - Ongoing

### Relevant Coursework:

- **GIS:** *Introduction of Cartography and Geographic Information System, Advanced GIS, Remote Sensing Image Processing and Analysis, Software Engineering and GIS Development, Application and Development of Open Source GIS, GIS Development From Bottom Up, Thematic Cartography & Geo-Infographics Design*
- **Mathematics:** *Advanced Mathematics B I & II, Linear Algebra A, Probability and Statistics A, Discrete Mathematics, Digital Image Processing, Applications of Mathematics in Artificial Intelligence.*
- **Modeling:** *Quantitative Geography, Geographical Modeling and Geographical Computing, GIS for Spatial Analysis*
- **Computer Science:** *Intro to Artificial Intelligence, Fundamentals of Computer and Programming A, Artificial Intelligence Foundation and Application B, Computer Programming Languages, Data Structures and Algorithms (PKU, MOOC), Deep Learning and Large models, Application and Practice of Large Language Model*

## TECHNICAL SKILLS

**Programming:** Python, C++, LaTeX, MATLAB, C#, H5C3

**Frameworks/Tools:** PyTorch, Hugging Face, Ultralytics, Triton, CUDA, FastAPI, Streamlit, Qt6

**Software:** ArcGIS, Adobe Illustrator, CorelDRAW, QGIS

**Computer Vision, Large Language Model, and Deep Learning Algorithms**

## PUBLICATION

L. Liu, **Z. Xu**, S. Yao, M. Lv, and C. Liu (2024). "Optimizing the Spatial Accessibility of Outdoor Sports Facilities: A Greedy Heuristic Algorithm Based on Remote Sensing Images." *International Journal of Digital Earth*. 17 (1).  
doi:10.1080/17538947.2024.2390427.

## RESEARCH EXPERIENCE

### **Bachelor's Thesis: A Research on the Construction of Lightweight Open Vocabulary Detector for Remote Sensing Images**

Supervised by Prof. Jianping Wu, Key Laboratory of Geographic Information Science, Ministry of Education, ECNU, CHN

#### **Student Research Assistant**

October 2024 – May 2025

- Introduced a light-weight solution for training open vocabulary detection models for remote sensing images using the xView dataset and a single RTX 4090 GPU
- Designed and implemented pretraining on xView, dataset transfer finetuning on DIOR, and task transfer finetuning on Potsdam experiments to test the performance of the proposed model
- Explore and discuss the mechanism of the open vocabulary detection model with the basic machine learning theory
- English technical report: <https://github.com/CatManJr/Train-an-OVD-within-21-dollars>

### **Research Title: Deep Learning-Based Recognition and Accessibility Analysis of Outdoor Stadiums in the Yangtze River Delta**

Supervised by Dr. Shenjun Yao, Key Laboratory of Geographic Information Science, Ministry of Education, ECNU, CHN

#### **Student Research Assistant**

May 2024 – May 2025

- Introduced a slicing-aided pipeline for efficiently selecting data to label with CLIP zero-shot interference  
Code available at: <https://www.kaggle.com/code/catmanjr/zero-shot-potential-labels-finding-by-clip>
- Trained an appropriate model for sports facilities in ultra-high resolution aerial images based on YOLO11-obb; deployed SAHI (Slicing Aided Hyper Inference) to recognize outdoor sports facilities more precisely; Modified the Gaussian 2SFCA method to a 3-step one (including an extra supply level step)  
Github: <https://github.com/CatManJr/YOLO11-Sports-Facilities>
- Implemented project supervision and time management; acted as a consultant for troubleshooting technical problems, including searching for free and open-source aerial imagery data sources, model deployment, etc.
- Selected as a "Municipal-level undergraduate innovation project" by Shanghai City

### **Research Title: Optimizing the Spatial Accessibility of Outdoor Sports Facilities: A Greedy Heuristic Algorithm Based on GIS and Remote Sensing Images**

Supervised by Dr. Shenjun Yao, ECNU Key Laboratory of Geographic Information Science, Ministry of Education, ECNU, CHN

#### **Student Research Assistant**

Oct 2023 - Mar 2024

- Built a pipeline of cleaning null images from the TIFF raster dataset and converting TIFF and related TFW files to PNG and PNGW files; It had been deployed to process 90,692 files
- Performed inference on the processed datasets using the trained YOLOv5+CSL models, mastered the mechanism of the models for the paper writing; compared the identification results with land use data to improve the accuracy of the sports facilities used in the study
- Collaborated in the development of an optimization algorithm tailored for better fairness and accessibility, and built Monte Carlo simulations in Python to evaluate the performance and efficacy of the optimized outcomes robustly
- Engaged in writing and revising the paper, including drawing illustrations and managing the references via EndNote

## PROFESSIONAL EXPERIENCE

**Teaching Assistant - Software Engineering and GIS Development**, ECNU, Shanghai, China Feb 2024 - Jul 2024

- Tutored in the 36-hour theory class, organized regular Q&A sessions after classes, implemented extended learning about the GDAL library, and about debugging
- Instructed in the 18-hour lab class, assisting 75 students in setting up the necessary environments, completing development assignments, and the final project

**Participant, Field Practice of Comprehensive Geography**, China Jul 2024

- Conducted a field investigation in the Huaihe River and studied the working principle of real-time weather forecasting based on the General Circulation Model (GCM) and the standard instruments used in meteorological observations
- Collaborated on a research proposal addressing the impact of wind power generation on intertidal vegetation growth conditions in the Silting Coastal Area of Northern Jiangsu Province, mainly responsible for the writing of the proposed research methodology
- Proposed an aerial image segmentation approach by introducing U-Net++, which was well-received in the presentation
- Created a Story Map in ArcGIS online and used CorelDRAW to design a thematic map of changes in the coastline of the Huaihe River from 1760 to 2022

## SELECTED OPEN SOURCE PROJECTS

**My Kernel Templates** <https://github.com/CatManJr/my-kernel-templates> June 2025 - Ongoing

- A continuous code repo to store the kernels I implemented in Triton or CUDA. It consists of several independent projects about GPU kernels.
- Flash-Attention sub-project, which was inspired by CS336 at Stanford, provides a pure Triton kernel for the forward and backward passes of Flash Attention-2. The related tech blog has received over 8k reads, 341 likes, and 384 collects on Rednote, a Chinese social media <http://xhslink.com/m/8wh6Zzpac54>

**How to Teach Your Cat DDPM** <https://github.com/CatManJr/How-to-Teach-Your-Cat-DDPM> Oct 2024 - Dec 2024

- An interest-led spare time project happened while taking the *Digital Image Processing course*
- Reproduced the proof of the DDPM model in "Understanding Diffusion Models: A Unified Perspective," arXiv preprint arXiv:2208.11970, 2022; practiced mathematical writing with LaTeX

## HONORS & AWARDS

- 2024 ICM (Interdisciplinary Contest in Modeling) Honorable Mention (Problem D)
- Third Prize at Shanghai Region, 2023 CUMCM (Contemporary Undergraduate Mathematical Contest in Modeling)
- Individual Third Prize, 2023 Geographic Information Technology and Application Competition
- Third-class Scholarship for Outstanding Undergraduate Students, ECNU, 2022-2023
- Second-class Scholarship for Outstanding Undergraduate Students, ECNU, 2021-2022
- Excellent Student Leader (*Twice*), ECNU, 2022-2023 & 2021-2022
- Outstanding Officer of Youth League Committee, Student Union (*Twice*), ECNU Guanghua College, 2021 & 2022

## ADDITIONAL INFORMATION

**Languages:** Mandarin Chinese (Native Speaker), English (IELTS: 7.5)

**Activities:** *President*, Geography E+ Club, ECNU School of Geographic Sciences 09/2023 - 06/2024

*Head of Branding Department*, Geography E+ Club, ECNU School of Geographic Sciences 09/2022 - 09/2023

*Volunteer*, ECNU Mengyou Small Animal Protection Society 09/2022 - 06/2024

*Officer in Information and Communication Center*, ECNU Guanghua College 09/2021 - 06/2022

*Student Mentor*, 1+8 Mentorship Program, ECNU School of Geographic Sciences 09/2022 - 09/2023

*Tutor*, "Earth Speaks" Geography Tutor Group, ECNU School of Geographic Sciences 12/2022-02/2023

**Interests:** Tennis, Soccer, Simulate Racing, Guitar, Music Writing, ACM-like competitions, Illustration