Haoyuan Yin

Tel: 431-328-7218 | Email: h56yin@uwaterloo.ca
Address: 11 Margaret Ave, Kitchener, ON N2H 6M4
Personal Website: https://Tastal.github.io | **GitHub:** https://github.com/Tastal

EDUCATION BACKGROUND

University of Waterloo Waterloo, ON, Canada

- Degree: Bachelor of Science, Honours Physics (Expected in April 2026)
  09/2020-04/2026
- GPA: 3.3

Awards

- President's Scholarship (2021)
- Academic Standing of Excellent (Fall 2020, Winter 2021, Spring 2021, Fall 2022)
- Academic Standing of Good (Winter 2023, Fall 2023, Winter 2024, Spring 2024, Fall 2024, Winter 2025)

MANUSCRIPT IN PREPARATION

Yin, H., Zemskova, B., Unsupervised Classification of Global Dissolved Inorganic Carbon Profiles Based on Gaussian Mixture Models, University of Waterloo, 2025.

RESEARCH EXPERIENCE

University of Waterloo Waterloo, ON, Canada
Research Assistant *05/2025-Present*
Supervisor: Dr. Barbara Zemskova, Dept. of Applied Mathematics
https://github.com/Tastal/DIC-Clustering

- Conducting unsupervised classification of global dissolved inorganic carbon (DIC) profiles using gaussian mixture models (GMM) on ECCO-Darwin ocean-biogeochemical data.
- Developed a Python-based analysis pipeline integrating NumPy, pandas, Matplotlib, and scikit-learn, capable of processing over 10^6 global DIC profiles for dimensionality reduction and clustering.
- Applied principal component analysis (PCA) and GMM to capture non-linear vertical carbon stratification features and evaluate cluster robustness through posterior probability and spatial coherence metrics.
- Generated global cross-sectional maps linking data-driven clusters to physical oceanographic structures such as the thermocline and deep-water formation regions.
- Identified 15 statistically robust clusters that can be grouped into 5–6 major water-mass regimes (e.g., North Atlantic Deep Water, Antarctic Intermediate Water), achieving ~97% average posterior probability (≈20% higher clustering confidence than k-means).
- Contributed core analysis scripts and visualizations for a manuscript in preparation; strengthened expertise in data-driven physical oceanography and unsupervised machine learning.

Independent Research Project — CSProfAlign (AI-Powered Professor Discovery Platform)
https://github.com/Tastal/CSProfAlign *01/2025 – Present*

- Developed an AI-driven full-stack platform integrating CSRankings data with LLM-based semantic matching to identify research-aligned supervisors.
- Built Vue 3 + Pinia frontend and FastAPI + vLLM backend, containerized via Docker for cross-platform GPU deployment (Windows/macOS/Linux).
- Integrated DeepSeek, ChatGPT, Gemini, Chaude, and local Qwen 0.5B/1.5B/7B models; optimized batch inference to reduce latency from 20 s to 2 s per query.

- Implemented adaptive GPU-memory allocation, JSON-structured prompting, and robust error handling for scalable LLM inference.
- Demonstrated end-to-end skills in full-stack AI engineering, model deployment, and reproducible scientific computing.

RELEVANT PROJECTS & INTERNSHIPS

Artivition Projects x Encore Lab (University of Toronto) Toronto, ON
Game Development & Tech Innovation Intern *06/2025-Present*

- Developed and deployed Artivition.com website; managed hosting, version control, and content delivery.
- Co-designed and prototyped the VR version of "Fall of Artica" in Unity for Meta Quest 3, focusing on interactive storytelling and scene logic.
- Collaborated with interdisciplinary teams to bridge technical, design, and educational perspectives in immersive media projects.

CCHAC (Chinese Cuisine and Hospitality Association of Canada) Markham, ON
Graphic and Web Design Intern *09/2024-12/2024*

- Enhanced the association's digital presence by redesigning UX/UI layouts in WordPress and Canva.
- Produced over 20 bilingual digital posters and brand visuals to promote national culinary events.
- Optimized the website's structure and visual hierarchy, improving engagement and page load times.

Microsoft Azure Accelerate Program Waterloo, ON
Cloud Computing Intern *05/2022-08/2022*

- Participated in Microsoft's applied cloud training initiative focused on Azure architecture and automation.
- Designed and deployed a team health chatbot integrating Azure Functions, SQL databases, and API triggers.
- Improved workflow automation efficiency by ~30% while learning DevOps and CI/CD fundamentals.

***Shanghai Haoyuan* Chemexpress *Co*., Ltd** Shanghai, China
Data Analysis Intern *08/2020-01/2021*

- Collected and cleaned chemical compound datasets for catalog integration and internal database maintenance.
- Performed market trend analysis on competitor pricing and customer demand using Excel and Python.
- Streamlined technical documentation, improving the visual clarity of molecular data presentations.

SKILLS

- Programming: Python (NumPy, pandas, Matplotlib, scikit-learn), C/C++, HTML/CSS, Git
- Machine Learning & Data Analysis: Unsupervised Learning (GMM, PCA), Clustering, Data Visualization, High-performance Computing, ECCO data handling
- Simulation & Graphics: Unity, Unreal Engine, Blender, Stable Diffusion, Photoshop, Figma
- Tools: Cursor, Claude Code, Kiro, VS Code, WordPress

Research Interests

- Real-time fluid–structure interaction and computational fluid dynamics
- Physics-informed and operator-learning frameworks for physical simulation

- Graph Neural Networks, Fourier Neural Operators, Physics-Informed Neural Networks, and Neural Flow Maps
- Hybrid ML–physics solvers for simulation in game engines, VR/AR, and scientific visualization