CURRICULUM VITÆ

Wenyu Chiou

Ph.D. Candidate · Civil & Environmental Engineering | Complex Adaptive Water Systems (CAWS) Lab, Lehigh University

My research develops governed LLM-driven agent and multi-agent systems for coupled human–water modeling — bridging empirical behavioral data, interpretable rule-based simulation, and large language models to study human–flood interaction and decision-making under risk.

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§ 01 Education

Ph.D., Civil & Environmental Engineering, Lehigh University — Aug 2024 – present · expected 2028

Complex Adaptive Water Systems (CAWS) Lab · Advisor: Prof. Y.C. Ethan Yang · Center for Catastrophe Modeling and Resilience (CMR)

Dissertation: *Advancing Coupled Human-Flood Modeling: From Empirical Foundations to LLM-Driven Multi-Agent Simulation*

Research: LLM-driven coupled ABM–catastrophe model framework for household flood adaptation; governed agent framework (WAGF) validating LLM agents against behavioral theory before they act; multi-agent systems for quantitative risk assessment.

M.S., Hydrological and Oceanic Sciences, National Central University (NCU), Taiwan — Sep 2021 – Jun 2023

Surface Hydrology Group · Institute of Hydrological and Oceanic Sciences (IHOS) · GPA 4.3/4.3 · Dean's Award, College of Earth Sciences (Jun 2023). Thesis: groundwater flow characteristics of the Taoyuan coastal zone.

B.S., Earth Sciences, National Central University (NCU), Taiwan — Sep 2017 – Jun 2021

GPA 3.9/4.3 · Best Undergraduate Student Project and Report (Nov 2020).

§ 02 Research Experience

Ph.D. Candidate — Complex Adaptive Water Systems (CAWS) Lab, Lehigh University — Aug 2024 – present

- Co-authored the *Water Resources Research* (2026) article substituting large language models as the behavioral engine of a human–water simulation — published; second author of two.
- Building a governed LLM-agent framework (WAGF) with validation rules, execution control, and audit logs — agent decisions are checked against physical constraints and behavioral theory before simulation state updates; research software in preparation for release.
- Built a 52,141-household coupled agent-based × catastrophe flood model (27 census tracts, 2011–2023) with NFIP premium, payout, and deductible mechanics; simulated payouts validated against OpenFEMA insurance-claims data over 50 Monte Carlo runs (median + IQR).
- Designed and fielded a 937-household flood-adaptation survey (Passaic River Basin, NJ) and a survey-to-agent parameterization pipeline (structural equation modeling → Bayesian calibration) that turns empirical data into calibrated agent parameters.

Research Assistant — Surface Hydrology Group, IHOS, National Central University — 2023 – 2024

- 2D/3D groundwater numerical modeling and calibration for the Taoyuan coastal zone (HydroGeoChem); evaluated nature-based solutions for groundwater and watershed management.

Summer Research Intern — National Science and Technology Center for Disaster Reduction (NCDR), Taiwan — Summer 2022

- Processed IPCC AR6 downscaled climate-model ensembles for Taiwan; automated multi-model comparison pipelines (Python, MATLAB).

Undergraduate Research Intern — Institute of Earth Sciences, Academia Sinica — Jul – Aug 2020

- Stable-isotope hydrology (δD/δ^{18}O), Feitsui Reservoir.

§ 03 Publications

PEER-REVIEWED

[1] Yang, Y. C. E., & **Chiou, W.** (2026). Leveraging Large Language Models for Agent-Based Simulation of Human–Water System Interactions. *Water Resources Research*, 62(6), e2025WR042111. doi.org/10.1029/2025WR042111 Published

MANUSCRIPTS UNDER REVIEW

[2] **Chiou, W. Y.**, Yang, Y. C. E., Tanaka, T., Jamrussri, S., & Feng, S. Household flood adaptation and financial outcomes for homeowners and renters: A coupled agent-based and catastrophe flood modeling framework. *Journal of Hydrology*. Under review

[3] First-author manuscript — flood-adaptation decision pathways across marginalized and non-marginalized groups, identified via structural equation modeling. *Sustainable Cities and Society*. Under review

CONFERENCE PRESENTATIONS

Chiou, W., & Chiou, H. — "What Makes AI Believable? Comparing AI and Human Responses in Mental Health Risk Assessment." ISDSA 2026 Annual Meeting (International Society for Data Science and Analytics); recorded presentation.

Chiou, W., Yang, Y. C. E., Tanaka, T., Jamrussri, S., & Feng, S. — "Modeling Long-Term Household Flood Adaptation under Social Heterogeneity: A Coupled Agent-Based Modeling Framework." Poster NH41E-0449, AGU Fall Meeting 2025.

ISHC 2025, Tokyo, Japan — oral presentation 38-03, July 2025; co-authored with collaborators across Lehigh, FAU, Kyoto, and UTokyo.

AGU Fall Meeting 2023 — abstract; submarine groundwater discharge study combining electrical resistivity tomography, field observation, and numerical simulation.

§ 04 Awards & Fellowships

Dean's Award, College of Earth Sciences — National Central University — Jun 2023

Interdisciplinary Research Fellowship (Hydrology/Geophysics/Geology) — NSTC, Taiwan · $4,000 USD/year — 2021 – 2023

Best Undergraduate Student Project and Report in Earth Sciences — National Central University — Nov 2020

Undergraduate Student Research Project Grant — NSTC, Taiwan · $1,600 USD total — 2020 – 2021

§ 05 Research Interests

- LLM multi-agent systems
- Agent evaluation & governance
- Agent-based modeling
- Catastrophe modeling
- Human–water interaction
- Decision-making under risk
- Structural equation modeling

§ 06 Methods & Tools

AGENT SYSTEMS

LLM agents · multi-agent systems · structured prompting · validation rules · audit logs · simulation coupling

PROGRAMMING

Python · TypeScript · R · MATLAB · C++

SOFTWARE & TOOLS

Git · Jupyter · SPSS · AMOS · ArcGIS Pro

AI TOOLING

Claude Code · Codex CLI · Cursor · Ollama · MCP · plugin/skill development

§ 07 Research Software · LLM Agent Systems & AI Research Workflows

research-hub

AI-operable research workspace · PyPI v1.1.1 · Maintained open-source tool

An AI-operable research workspace for Zotero, Obsidian, and NotebookLM — search, ingest, and sync papers through one CLI, MCP server, and REST API. Listed in Awesome MCP Servers.

FLOODABM

Coupled ABM × CAT model · Research prototype, archived

A large-scale simulation (52,141 households) that quantifies human–flood interaction and insurance outcomes; Zenodo-archived companion code with CITATION.cff.

codex-delegate

AI research workflow tooling · Maintained open-source tool

Agent-delegation wrappers that verify change from git state, not the delegate's own report; a regression test pins a real upstream failure. CI on Ubuntu and Windows.

fable-method-harness

Portable AI-agent operating harness · Maintained open-source tool

Cost/model routing with an audit trail for AI-assisted work — matches strong-model quality at about 2.5× lower cost in a pre-registered benchmark.

WAGF — Water Agent Governance Framework

LLM-agent simulation governance · In preparation for release

A general framework for governed LLM agents, demonstrated in human–water simulation, that keeps coupled behavioral outcomes stable and physically sensible.

agent-collab-skills

Multi-agent orchestration · Maintained open-source tool

Multi-agent orchestration — task splitting, output reconciliation, adversarial debate, shared memory, and a pre-merge acceptance gate.

ai-research-skills

15-skill research catalog · 5-plugin marketplace · Maintained open-source tool

A 15-skill catalog that first vets whether a research idea is worth doing — open, a contribution, feasible — before design, build, and drafting run. Cross-runtime SKILL.md contract.

§ 08 Professional Service

Graduate Student Committee Member — Lehigh University, Dept. of Civil & Environmental Engineering — 2025 – present

§ 09 Community & Open-Source

awesome-agentic-ai-zh

4.7k+ GitHub stars (July 2026)

Trilingual (zh-TW / zh-Hans / EN) 7-stage roadmap from LLM basics to production multi-agent systems; automated checks keep all three languages in sync; external contributors.

Open-source contributions

18 merged pull requests across ZhuLinsen/daily_stock_analysis (×10, end-to-end Taiwan-market support), BuilderIO/agent-native (×4, incl. a regression-tested fix), langchain-ai/openwiki (security fix), punkpeye/awesome-mcp-servers, coralline, and NVIDIA/skills.

Languages Mandarin Chinese — native · English — professional

Revised July 2026 · wenyuchiou.github.io