

YU-WEN CHEN

MACHINE LEARNING RESEARCHER - PHYSICAL AI & SATELLITE REMOTE SENSING

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PROFESSIONAL SUMMARY

Machine learning researcher who builds physics-ML hybrid models and ships them into production at scale. NASA FINESST Graduate Fellow; Ph.D. expected Dec 2026. Built and scaled PyTorch pipelines that fuse 3D radiative-transfer physics with deep learning across **3M+ satellite frames** on HPC (SLURM), cutting a key retrieval-error metric by **76%** - peer-reviewed in *Atmos. Meas. Tech.* (2025). Strong in spatiotemporal modeling, inverse problems, and calibrated uncertainty quantification (conformal prediction), with hands-on large-scale climate and remote-sensing dataset engineering.

CORE COMPETENCIES

ML / Physics-Hybrid Modeling: PyTorch, physics-ML hybrid methods (3D radiative transfer + deep learning), physics-informed neural networks, spatiotemporal modeling, gradient-boosted trees, deep ensembles, tabular deep learning

Evaluation & Uncertainty: Conformal prediction, calibrated uncertainty quantification, date-blocked k-fold cross-validation, inverse problems, Bayesian optimization, statistical inference

Climate & Remote-Sensing Data: Large-scale satellite remote sensing (OCO-2/MODIS), multi-sensor collocation, atmospheric/Earth-system datasets, geospatial search (ECEf, KD-Tree)

Languages & Infra: Python (expert), PyTorch, Fortran, AWS, HPC/SLURM, Linux, Git

EXPERIENCE

University of Colorado Boulder Jan 2022 - Present

NASA FINESST Graduate Fellow / Graduate Researcher

- Cut CO2 retrieval error by **76%** in cloud-adjacent scenes by building a physics-ML hybrid correction (3D radiative transfer + deep learning); peer-reviewed in *Atmos. Meas. Tech.* (2025).
- Shipped an ensemble ML system (XGBoost, Gaussian-NLL deep ensembles, TabM) with calibrated conformal-prediction uncertainty to detect and remove satellite retrieval anomalies at scale, validated via date-blocked cross-validation.
- Engineered a large-scale climate data pipeline collocating OCO-2/MODIS satellite feeds (banded KD-Tree geospatial search, Numba-accelerated on HPC/SLURM, **3M+ frames**); used agentic AI tooling (Claude, GitHub Copilot) to compress the research-to-deployment cycle. Managed collaborations across 4 research institutes.

University of Colorado Boulder Aug 2024 - Present

Graduate Researcher - Arctic Surface Properties

- Built an automated Python system that autonomously detects and corrects sensor anomalies in high-fidelity Arctic radiometric measurements, standardizing raw outputs across diverse radiometric sensors.

Academia Sinica - Research Center for Environmental Changes Jan 2019 - Jul 2021

Research Assistant - Pollution Transport Analysis

- Built autoregressive spatiotemporal generative models (CNN/LSTM) to model non-linear pollutant transport dynamics across complex terrain; presented at the AI: Modeling Oceans and Climate Change (AIMOCC 2021) Workshop at ICLR 2021.

EDUCATION

Ph.D., Atmospheric & Oceanic Sciences - University of Colorado Boulder (NASA FINESST Fellow) Expected Dec 2026

M.S., Atmospheric & Oceanic Sciences - University of Colorado Boulder 2023

M.S., Chemistry - National Taiwan University 2018

B.S., Chemistry (Minor: Atmospheric Science) - National Taiwan University 2016

SELECTED HONORS

- NASA FINESST Award (13% selection rate) - University of Colorado Boulder, 2024
- Summer School for Inverse Modeling of Greenhouse Gases - Colorado State University, 2024
- Government Scholarship to Study Abroad - Taiwan Ministry of Education, 2023