Zhihao **LIU**

Data Scientist · Machine Learning · Energy & Climate

Beijing, CN & Doha, Qatar

(+974) 5008-6202 liuzhihao109@foxmail.com liuh886 Zhihao LIU zhihaol.eu.org

About Me

Data scientist bridging modeling and delivery. I build evidence-based ML solutions for energy and climate applications (e.g., wind/solar resource analysis, bias correction, spatial downscaling), and translate real-world requirements into implementable workflows and clear narratives for stakeholders.

Experience

Business Development (New Energy)

Full-time, Qatar

BGP, China National Petroleum Corporation

2024.08 - Present

- Support business development by translating customer needs into internal requirements and clear solution narratives.
- Contribute to proposal/tender preparation, including requirements clarification, coordination across technical/commercial stakeholders, and submission quality control.
- Draft lightweight market/competitor briefs on energy-transition opportunities to inform internal prioritization.
- Supported tender proposal work for a major offshore program in Qatar.

Data Scientist (Consultant)

Freelancing, Norway

Eurostar / IKOS

2024.02 - 2024.05

- Consulted for the development of a train tracking platform.
- Applied the Unscented Kalman Filter (UKF) algorithm to estimate train state and fuse sensor data in real-time, detecting unplanned stops and delays in train service.
- Engineered a microservice using FastAPI and PostgreSQL.

Teaching / Research Assistant

Part-time, Norway

University of Oslo

2021.11 - 2023.11

- Served as a Teaching Assistant for GEO4300/9300 (Geophysical Data Science), Fall 2023, where I conducted a 35-hour Python lab and provided hands-on scientific programming training, and data analysis to students.
- How does climate change impact wind and solar production? This is a summer scholar project funded by UiO: Energy and Environmental. Focusing on exploring machine learning algorithms for bias correction and spatial downscaling. The methodology helps to improve the accuracy of wind and/or solar resource analysis.
- Research assistant on SNOWDEPTH (sponsored by Norwegian Research Council): spaceborne data + machine learning for spatiotemporal modeling of seasonal snow depth, a key factor in climate and hydropower.

Field Technician / Assistant Project Manager

Full-time, China

BGP, China National Petroleum Corporation

2014.07 - 2021.07

- Participated in over 12 offshore surveys globally in a world-class team, BGP Prospector. The focus is to deliver high-quality geophysical datasets and de-risking offshore oil operations.
- Developed data processing pipeline and quality control software for geophysical surveys online/ offline.
- Took on technical responsibilities such as contract technical review, patents, and conference participation.
- Was promoted to a senior position as Assistant Project Manager in January 2021.

Education

University of Oslo

Norway

M.Sc in Geoscience

2021.08 - 2023.07

- My study includes broad topics in Geosciences, from Earth observation, geophysical modeling, the physical basis of climate change, to carbon capture and storage (CCS) and energy transition.
- I presented my thesis at the International Union of Geodesy and Geophysics (IUGG) 2023 Berlin with a traveling grant and sponsorship from the Industrial Liaison program.
- Active member of the Oslo Society of Exploration Geophysicists (OSEG).
- GPA 3.875/4.0.
- Thesis: Snow Depth Retrieval and Downscaling using Satellite Laser Altimetry, Machine Learning, and Climate Reanalysis (A)

South West Petroleum University — China

B.Sc in Geodesy and Geomatics — 2010.09 - 2014.07

- With a background in Engineering, GIS and Programming for data analysis.
- Thesis: A WebGIS System for Urban Infrastructure Management (A)

Projects

Bias-correction and spatial downscaling of weather data for energy system modeling — ITS, UiO

Summer Researcher — 2023.05 - 2023.07

- Understanding the resource availability and variability of solar and wind energy generation is essential to designing and planning optimal energy systems. This becomes more important when climate change has changed the weather conditions of different regions of the world.
- A review of machine learning-based downscaling techniques for climate variables
- Capture historical patterns of weather anomalies by QDM (Quantile Delta Mapping). And use it for downscaling of CIMP6, to get debiased wind speed for energy system modeling.

SNOWDEPTH - Global snow depths from spaceborne remote sensing for permafrost, high-elevation precipitation, and climate reanalysis — GEO, UiO

Research Assistant — 2021.12 - 2023.05

- Seasonal snow depth is a key component of surface energy balance and the water cycle, which is related to scientific topics e.g. permafrost thawing, ice/snow albedo feedback, high-mountain precipitation, hydropower…Estimating snow depth by a 500 km away satellite is a challenging task, and requires dedicated, careful signal processing:
- Contributed a reliable coregistration algorithm to xDEM.
- Developed a comprehensive workflow for retrieving snow depth from satellite laser altimetry, downscaling it by XGBoost, and interpreting snow dynamics by Shapley values.
- Demonstrated proficiency in handling and analyzing large and diverse climate datasets and modeling skills.

Offshore seismic exploration in the Norwegian Sea — Offshore Bergen, NO

Technician — 2020.07 - 2020.10

- Quad 35 survey (2020.07-2020.10) is the world's first Ultra High Density (UHD) multi-client 3D hybrid seismic acquisition in the North Sea.
- Applied wide-tow sources technology to improve the near-offset sampling. This will become a key solution for offshore wind seismic.
- Apart from Quad35, I have another project in the Barents Sea, and the North Sea..which have given me a broad understanding of the offshore geophysical survey, and a good understanding of the offshore energy industry.

Creative Modeling Works

Using 5.8 million to buy a unit in Oslo, which one is worth?

The goal of this project was to determine which unit to buy in Oslo using multiple-criteria decision analysis (MCDA). The median price for a unit in the city is 5.8 million. The project involved scraping property data from Finn, cleaning the data, and gathering spatial information from open-access databases, OpenStreetMap, and satellite images. An MCDA model was then created to make the final decision.

What if the ice block expedition 1959 happens in 2021?

In 1959, a three-ton block of ice from Mo i Rana by the Arctic Circle was trucked to Libreville by the Equator with an 11% mass loss (the Ice Block Expedition of 1959). Is that true? What if we do it again in 2020 or 2021? I applied an energy balance model and coupled ERA5 reanalysis with such a historical event.

How to bury Longyearbyen by an avalanche?

Avalanches are rapid snow mass movements over snow-covered slopes, which could be dangerous for people living in mountainous terrain due to long-time exposure. So, how to bury a town with a designed avalanche? I used Software RAMMS::Avalanche® to simulate slab avalanche movement by the Voellmy-fluid friction model. I found NVE's new report may overestimate the size of the avalanche in some scenarios.

Agriculture change detection: the expansion of West Nile delta

Over the past three decades, Egypt has faced a significant challenge in ensuring food security due to its rapidly growing population. As a result, the Nile Delta region has become increasingly crowded. To tackle this issue, a study was conducted in the western Nile region using spectral analysis, NDVI, classification, and change detection techniques. The purpose of this study was to identify changes in agriculture practices and land use patterns over time.

Publications, Conferences and Patents

Snow Distribution Patterns from Satellite Laser Altimetry — Peer-reviewed Paper
Zhihao Liu, Désirée Treichler, Simon Filhol · 2025

Snow Depth Retrieval and Downscaling Using Satellite Laser Altimetry, Machine Learning and Climate Reanalysis — Oral Presentation
Zhihao Liu, Désirée Treichler, Marco Mazzolini · IUGG 2023, Berlin

Unlocking the Secrets of Snow Depth - A Study of Satellite Altimetry and High-Precision Digital Elevation Models — Oral Presentation
Sustainability Day 2023, UiO

An identification system for underwater seismic devices — Patent
PRC 201911154941X · Issued May 13, 2022

Wide-towed sources in streamer seismic: a case study from Norway Q35 — Conference
Zhihao Liu, Bo Wen, Yuanjie Liu, Xuebin Qin, Qian Zhao · Society of Petroleum Geophysicists 2021, Chengdu

Offshoreorinet v1.0 seismic QC software — Software Copyright
2020SR0194691 · Issued Mar 2, 2020

Skills and Topics

Languages	Chinese, English
Tech Stacks	Python, Scikit-learn, SciPy, XGBoost, Xarray, Geopandas, Shapely, Rasterio, GIS, Kriging, Kalman Filter
Engineering	FastAPI, PostgreSQL, Docker, ETL, Git, GitHub, GCP
Technology Topics	Weather & climate data, Wind & solar resource analysis, Bias correction & spatial downscaling, Snow/hydrology for hydropower, Energy transition