Zhihao LIU

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SUMMARY

About me

As a geomatics professional with 5 years of experience in offshore geophysical surveys, I developed strong skills in geostatistics and modeling. I have worked with diverse geodata sources, such as **seismic**, **climate reanalysis**, and **remote sensing**, demonstrating my ability to adapt to different domains and challenges. I am passionate about delivering geodata as a service and providing data-driven solutions for the **energy sector and climate issues**. I am looking for interesting datasets, sharp minds, and cutting-edge projects to apply my expertise after graduation (2023.06).

WORK EXPERIENCE

Research Assistant on Geomatics

UiO [11/2021 – Current]

- Skilled in **Geostatistics** and **Geospatial Modeling** using Python, with a toolkit including xDEM, SciPy, Rasterio, Shapely, GeoPandas, Multiprocessing, PCA, and Machine learning (XGBoost regression).
- Handled **various datasets** such as ERA-5, ICESat-2, MODIS, Norway National DTM, and global DEMs (Copernicus, Arctic DEM, etc).
- Experienced used **GIS tools** such as ArcGIS, QGIS, and automated GIS scripts.

Geomatics Professional

BGP Offshore, China National Petroleum Corporation [07/2014 – 06/2021]

- Participated in over 12 offshore seismic surveys (3D/4D/OBN) as a field technician globally (Norway, UK, West Africa) in a world-class seismic team.
- Developed data processing pipeline and optimized workflows through data-driven solutions (my software).
- Took technical responsibilities such as contract technical review, patents, and conference publications.
- Registered as a Licensed Surveyor in P.R.C.
- Promoted to a senior position as assistant party chief on seismic vessel in 2021.01.

EDUCATION

Master in Geoscience

Universitetet i Oslo [15/08/2021 – Current]

Courses (GPA 3.75/4.0):

Advanced Remote Sensing and Topographic Analysis (A)
Surveying, Photogrammetry and Spatial Analysis (A)
Geophysical Data Science (A)
Glacial and Periglacial Geomorphology
Floods, Avalanches and Landslides
IPCC Climate Change 2021-The Physical Science Basis

Thesis: Advancements in Snow Depth Retrieval Using Satellite Altimetry and Machine Learning

Bachelor in Geodesy and Geomatics

South West Petroleum University (China) [09/2010 – 07/2014]

Studied Engineering, Cartography, GNSS, Remote Sensing, and GIS (GPA 83/100).
Earned an A for Bachelor's thesis: A WebGIS system for urban infrastructure management.

PROJECTS

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

[01/2022 – Current]

Snowmass is key to understanding the snow-depth-related climate mechanism or application, e.g. permafrost thawing, high-mountain precipitation, hydropower...

- Participated in field trip and worked on the ICESat-2 dataset and a variety of DEM products;
- Optimized the popular 'NuthKaab Coregistration' and created one of the best co-registration algorithms: gradient descending coregistraion.
- Generated snow depth measurements for the entire of Norway. Now, I am trying to interpolate and feed the data into the climate & hydrological models and contribute my codes to the open-source GIS community.

Skills: Regression, Machine Learning, Terrain Analysis, Statistical downscaling, Multiprocessing, Git

North Sea Quad 35 Hybrid 3D seismic survey

[07/2020 – 11/2020]

Quad 35 is a well-known commercial seismic project in Norway. Historically It combined streamers and node acquisition.

- Worked as a technician for contract technical review, onboard acquisition, data QC & reprocessing, and follow-up work.
- Got the best commendation from the client for modeling this novel acquisition to make it more efficient and understandable.

Skills: Offshore data acquisition, Quality Control, Technical Support, Follow-up

Essaouira side-scan sonar survey, Offshore Morocco

[04/2017 – 04/2017]

The main point of the pre-survey was identifying the possible shallow hazards for the seismic streamers: reefs, shipwrecks, and pipelines.

- Designed and conducted a side-scan sonar pre-survey for seismic projects.
- I am also familiar with offshore magnetic and gravity surveys that we do simultaneously during seismic acquisition.

Skills: Side-scan Sonar, HSEQ, Independent Work

CREATIVE 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.

Skills: Spatial Analysis, MCDA Modeling

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. Is that true? What if we do it again in 2020 or 2021?

The energy balance model can explain the retreat of the glaciers but also can answer the question here. I applied an energy balance model and coupled ERA 5 with a historical event (the Ice Block Expedition of 1959).

Skills: Numerical Modeling, Climate Reanalysis, Time-series Analysis

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.

Skills: Mass Movement Modeling, GIS

CONFERENCES AND SEMINARS

Unlocking the secrets of snow depth - a study of satellite altimetry and high-precision digital elevation models

Oral presentation at Sustainability Conference 2023, UiO

Wide-towed sources in streamer seismic: a case study from Norway Q35

Zhihao Liu, Bo Wen, Yuanjie Liu, Xuebin Qin, Qian Zhao, Conference paper from Society of Petroleum Geophysicists 2021, Chengdu, China

A hybrid seismic acquisition: from wide-towed sources, sparse node to FWI

Zhihao Liu, Yuanjie Liu, Bo Wen, BGP geophysical technology overseas workshop 2021, Beijing, China (not open access)

An identification system for underwater seismic devices

Patent, PRC 201911154941X · Issued May 13, 2022.

Offshoreorinet v1.0 Offshore seismic QC software

Software Copyright, 2020SR0194691 · Issued Mar 2, 2020.

LANGUAGE

Mother tongue(s): **Chinese**

Other language(s): **English (professional working proficiency)** | **Norsk (beginner)**

VOLUNTEERS AND INTERESTS

Marathon

Not bad runner with 130 (half-marathon) and 330 (marathon) of the personal best.
Have organized medium size marathon (15K) and was in charge of supply and volunteers.

OSI Friluft - Volunteer

Board member - Media & Facebook.
Tour leader of outdoor events.

IMO 2022 - Volunteer

Tour guide for International Mathematical Olympiad 2022, Oslo.

REFERENCES

2021 - Present

Professor and Supervisor, Andreas Max Kääb, Email: a.m.kaab@geo.uio.no, Mobile: +47 22855812

Project Leader and Co-supervisor, Désirée Treichler, Email: desiree.treichler@geo.uio.no, Mobile: +47 22857869

2016 - 2021

Chief geophysicist of BGP Prospector, Bo Wen, Email: wenbo01@cnpc.com.cn, Mobile: +86 18622259275