Yi-Chen Ju

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Education

University of Oslo (UiO)	Aug. 2024 – Jul. 2025
Master of Science (Visting Master Student), Scientific Computing and Modeling	*Oslo, Norway*
National Tsing Hua University (NTHU)	Sep. 2022 – Jul. 2024
Master of Science, Scientific Computing and Modeling; GPA: 3.76/4.3	*Hsinchu, Taiwan*
National Central University (NCU)	Sep. 2018 – Jun. 2022
Bachelor of Science, Mathematics; GPA: 3.27/4.3	*Taoyuan, Taiwan*

Professional Research Experience

Numerical Tsunami and Solitary Wave Simulation Aug. 2024 – Jul. 2025
Wave Hydrodynamic Lab in University of Oslo *Oslo, Norway*

- Conducted numerical simulations of solitary wave-induced boulder transport using Smoothed Particle Hydrodynamics (SPH), with a dropping box wave generation mechanism and wave piston, analyzing the impact dynamics and subsequent interactions of objects after wave propagation.
- Utilized SPHysics to simulate and replicate previous experiments, with a focus on observing the displacement and motion of the boulder, including its rotation, to evaluate whether the simulation results align with the experimental findings.

Optimized Algorithm for Point Cloud with Region Down Sampling Sep. 2022 – Jul. 2024
Master Research Thesis in National Tsing Hua University *Hsinchu, Taiwan*

- Conducted an extensive literature review on Iterative Closest Point (ICP) algorithms, deep learning-based point cloud registration (DPCR) techniques, Point Transformer models, and their applications in feature extraction, correspondence matching, and geometric optimization, with a focus on advancements in rigid and non-rigid registration methods.
- Discovered improvements for the ICP algorithm by identifying and addressing the impact of overlapping but incorrect regions, introducing a method to exclude these areas, which enhanced computational efficiency and accelerated convergence in point cloud alignment.
- Developed an algorithm to reduce the influence of overlapping regions during ICP computations by minimizing the sampling weight of overlapping points. This approach mitigates the bias toward zero rotation and translation, achieving a balance between computational efficiency and point cloud registration accuracy.

Machine Learning for Galaxy Classification in Dark Matter Research Jul. 2021 – Oct. 2021
Summer Research Internship in National Central University Astronomy Institute *Taoyuan, Taiwan*

- Analyzed velocity dispersion profiles of brightest cluster galaxies (BCGs) and ordinary elliptical galaxies using open datasets from MaNGA and ATLAS, identifying distinct profile characteristics between the two galaxy types.
- Designed and implemented machine learning Random Forest and Multi-Layer Perceptron classification algorithms for BCG identification to analyze velocity dispersion profiles using features such as standard deviation, average, maximum, and minimum.

- Validated the classification model using labeled training and testing datasets, with subsequent application to the MaNGA 1270 database for automated BCG identification.

In-Depth Study and Presentation of Quantum Circuit Optimization   Nov. 2020 – Nov. 2021
Intern   *Taoyuan, Taiwan*
- Conducted research on optimizing quantum circuits to improve the implementation of practical quantum gates and enhance computational efficiency.
- Actively participated in seminars and discussions on advanced quantum computing topics, delivering presentations to communicate research findings effectively.

ML-Based Navigation and Obstacle Avoidance for LiDAR Robots   Jun. 2019 – Sep. 2020
Undergraduate Researcher in National Central University Robotics Lab   *Taoyuan, Taiwan*
- Developed a Q-learning algorithm with linear function approximation to enable a LiDAR-equipped robot to navigate and avoid obstacles autonomously.
- Applied machine learning principles to process real-world LiDAR sensor data, integrating angle and distance measurements into the robot's decision-making framework.
- Trained and tested the robot in a real-world environment, utilizing a custom reward function to optimize goal-reaching efficiency and collision avoidance.

Internship Experience

Technology R&D Department of Jin Shin Engineering Consultants Co., Ltd. Jul. 2024 – Present
Research Intern, Point Cloud Research and Development   *Hsinchu, Taiwan*
- Developed algorithms for point cloud compression and feature extraction, leveraging K-Nearest Neighborhood Search and curvature analysis to detect sharp edges and downsample planar areas while preserving key geometric features.
- Proposed a machine learning-based segmentation framework using Point Transformer, enabling automated differentiation of architectural components for Building Information Modeling (BIM).
- Implemented GPU-accelerated processing with Open3D and synthesized research findings into actionable strategies, driving innovation in point cloud applications within the company.

Logitech International S.A.   Jul. 2023 – Sep. 2023
NPI Operation Intern   *Hshinchu, Taiwan*
- Extracted and organized legacy database records, transitioning data into a centralized repository and creating a web-based interface to facilitate efficient access and retrieval for team members.
- Designed and implemented an automated tool to generate visual tree diagrams of complex folder structures, improving data navigation and enhancing workflow efficiency.

Extracurricular Experience

National Central University Basketball Team   Sep. 2018 – Jul. 2020
Team Captain
- Team captain, mentoring, strategizing, and fostering teamwork while building leadership.

National Tsing Hua University Basketball Team   Sep. 2018 – Jul. 2020
Team Player
- Tsinghua basketball player, fostering teamwork, discipline, and collaboration.

Specialized Skills

Programming: Python, MATLAB, C++

Languages: English (Fluent), Mandarin (Native)