Irwin Tay

+49 15123322126 | irwin0218@gmail.com | linkedin.com/in/irwintay/ | github.com/Irwintkc |
Personal Website
Moosach, Munich, Germany

Education

Ludwig Maximilian University of Munich — Munich, Germany
Masters in Astrophysics — *Oct. 2023 – Now*

National University of Singapore — Singapore
Bachelor of Science in Physics (Honours), Minor in Medical Physics, Specialisation in Astrophysics — *Aug. 2019 – June 2023*

Anglo-Chinese Junior College — Singapore
GCE A-Level, A for both H2 Physics and H2 Mathematics — *Jan. 2015 – Dec. 2016*

Experience

Master's Thesis with Machine Learning Application — Feb. 2025 – Now
Max Planck Institute For Astrophysics — *Munich, Germany*

- Applied statistical (Bayesian) and machine learning techniques to classify sources of gravitational wave signals from LISA data.
- Evaluated various supervised learning models including k-NN, SVM, Random Forest, XGBoost, NGBoost, and neural networks for classification performance.
- Employed Bayesian classification methods to enhance model interpretability and probabilistic understanding.
- Conducted hyperparameter tuning using Bayesian optimisation to improve model performance and generalisation.

Data Scientist Werkstudent — Oct. 2024 – Now
Orbem GmbH — *Munich, Germany*

- Utilized ClearML for training and evaluation of 3D image models aimed at business-oriented applications.
- Ensured high data quality by performing data preprocessing, cleaning, and validation tasks for accurate model performance.
- Collaborated with cross-functional teams to understand business requirements and translate them into machine learning solutions.
- Developed and optimized data pipelines to automate model training and deployment workflows.

AI/MRI Scientist Werkstudent — Oct. 2023 – Oct. 2024
Orbem GmbH — *Munich, Germany*

- Developed a simulation working pipeline with KomaMRI to produce simulated MRI images and obtained promising classification results for Sexing
- Worked on 3D object detection with nnDetection to potentially replace the pipeline of using YOLOX in 2D image detection
- Data formatting as well as data analysis using industry standard machine learning workflow - ClearML

Machine Learning Student Researcher — Feb. 2024 – Aug 2024.
Ludwig Maximilian University of Munich — *Munich, Germany*

- Researching on optimisation of neural network hyperparameters by introducing new mathematical framework and testing it empirically
- Implementing new novel models and neural network working pipeline into the field of Physics particularly Cosmology, with the potential aim of generalising

Bachelor's Thesis with Machine Learning Application — Aug. 2022 – June 2023
National University of Singapore — *Singapore*

- Conducted research on gravitational wave analysis using machine learning techniques with LISA data under A/Prof Alvin Chua
- Testing various analysing techniques such as interpolation and poly-fitting
- By using blackhole perturbation theory, successfully modelled a trivial case of gravitational waveforms, through the use of deep neural network, interpolation and polynomial fitting, produced by a special binary system.
- Potentially integrating the model into a Python Package (FastEMRIWaveforms - FEW)

Tutor — Apr. 2019 – Dec. 2022
Happy Tutors Learning Centre — *Singapore*

- Physics and Mathematics tutor who taught from Secondary to Junior College level

- Successfully helped students improve their grades and helping them to enter the top Junior College in Singapore

3rd Sergeant (3SG) Jan. 2017 – Jan. 2019

Republic of Singapore Air Force (RSAF) *Singapore*

- Served in the 505SQN of Air Civil Engineering Squadron
- Served as the Guard of Honour for the Air Force contingent in the 2018 National Day Parade for Singapore's 53rd birthday

Student Researcher Dec. 2015 – July 2016

*Agency for Science, Technology and Research (A*STAR)* *Singapore*

- Cultivated Swift programming language via Xcode to develop a prototype of the application
- Presented research findings at the 2016 AHFE conference in Florida, USA

Certificate

Learn C++ Programming -Beginner to Advance- Deep Dive in C++ | udemy Sept 2023

CS50AI: CS50's Introduction to Artificial Intelligence with Python | edX July 2022

Decentralised Finance (DeFi) Infrastructure | Coursera June 2022

Introduction to Data Science in Python | Coursera June 2022

Introduction to Structured Query Language (SQL) | Coursera May 2022

Achievement

Boon Lay Community Service Book Prize 2020 | People's Association 2020

A*STAR Science Award (Junior College) | A*STAR 2015

Bronze Award | Singapore Mathematical Olympiad (Senior Section) 2013

Honourable Mention | Singapore Mathematical Olympiad (Junior Section) 2012

Publication

Tay, Irwin and Swee Lan See (2017). "Adaptive UI for Enhanced Music Experience". In: *Advances in Affective and Pleasurable Design*. Ed. by WonJoon Chung and Cliff Sungsoo Shin. Cham: Springer International Publishing, pp. 105–115. ISBN: 978-3-319-41661-8. URL: https://doi.org/10.1007/978-3-319-41661-8_11.

Technical Skills

Languages:Python, Julia, LaTeX, SQL (MAMP), Swift, Markdown, Lua, C++, HTML, CSS
Developer Tools: Git, Gitlab, VS Code, Vim, NeoVim, Jupyter Notebook
Industry Tools: ClearML, Redbrick, Atlassian
Softwares: Mathematica, Matlab, Maple, Origin, SRIM & TRIM, Paravision
Libraries: pandas, NumPy, Matplotlib, Tensorflow, Keras, FEW, Scipy, scikit-learn, pytorch and more

Volunteering & Co-Curricular Activities

Singapore Students' Association of Germany (SSAG) Vice President Apr 2024 – Now

Boon Lay Community Service (Meet the People Session) Jan. 2020 – Dec. 2020

NUS Physics Society Event's Vice Director 2022 – 2023

NUS Physics Society Marketing Director 2019 –2020