

Irwin Tay

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[Personal Website](#)

Moosach, Munich, Germany

EDUCATION

Ludwig Maximilian University of Munich

Masters in Astrophysics

Munich, Germany

Oct. 2023 – Now

National University of Singapore

*Bachelor of Science in Physics (Honours), Minor in Medical Physics,
Specialisation in Astrophysics*

Singapore

Aug. 2019 – June 2023

Anglo-Chinese Junior College

GCE A-Level, A for both H2 Physics and H2 Mathematics

Singapore

Jan. 2015 – Dec. 2016

EXPERIENCE

Master's Thesis with Machine Learning Application

Max Planck Institute For Astrophysics

Feb. 2025 – Now

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

Orbem GmbH

Oct. 2024 – Now

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

Orbem GmbH

Oct. 2023 – Oct. 2024

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

Ludwig Maximilian University of Munich

Feb. 2024 – Aug 2024.

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

National University of Singapore

Aug. 2022 – June 2023

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

Happy Tutors Learning Centre

Apr. 2019 – Dec. 2022

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++ udey	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, L^AT_EX, 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 – May 2025
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