Rintaro Kanaki

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Education

Postgraduate Research Student(STFC DTP fundend), Astrophysics
Newcastle University, Newcastle upon Tyne, UK   September 2024 -

Master of Science, Astrophysics
Ludwig-Maximilians-Universität München, Munich, Germany   October 2020 - September 2023
Final Grade: 1.5

Master of Science, Astrophysics and Cosmology
Alma Mater Studiorum – Università di Bologna, Bologna, Italy   September 2021 - February 2022
Exchange study by Erasmus program

Bachelor of Science, Physics
Universität Bayreuth, Bayreuth, Germany   October 2017 - September 2020
Final Grade: 2.7

High School
Sakaehigashi High school, Saitama, Japan   April 2013 - March 2017

Research Experience

PhD Project: High-Performance Bayesian Galaxy Inference
Newcastle University, Sept. 2024 – Present
- Developing Bayesian hierarchical models for photometric redshift uncertainty and spatial selection effects in galaxy clustering and weak lensing.
- Methods: Log-Gaussian Cox Process, Variational Inference, Cosmological Parameter Inference using MCMC, Random Forest, kNN, HEALPix-based inference on simulated LSST-like catalogs.
- Supervised by Dr. Markus Michael Rau, Dr. C. Danielle Leonard, and Dr. Jere Koskela in the Newcastle Cosmology Group and Computational Statistics Group at Newcastle University.
- Project repository available on GitHub: `github.com/Rintaro0406/Spatial_Selection_Photo_z`

Master Thesis: Lognormal-Field Based Inference on Weak Lensing Maps with Graph Neural Networks
LMU Munich, Apr. 2022 – Sept. 2023
- Modeled non-Gaussian features of weak lensing convergence maps using full-sky lognormal simulations.
- Developed graph convolutional network for cosmological parameter inference, evaluated on N-body simulations and evaluated the result by comaparing the result from Fisher Forecast.
- Supervised by Dr. Oliver Friedrich and Prof. Dr. Daniel Grün, ACAI Group, LMU Munich.
- Master's thesis repository available on GitHub: `github.com/Rintaro0406/Master-Thesis`

Bachelor Thesis: Stability of Accretion Disks with Self-Gravity and Magnetic Fields
Universität Bayreuth, Apr. – Sept. 2020
- Developed a 2D model of magnetorotational instability in self-gravitating disks via linear stability analysis in the shearing box approximation.
- Supervised by Prof. Dr. Arthur Peeters, Theoretical Plasma Physics Group, Universität Bayreuth.

Work Experience

Humanitarian Aid Worker   Volunteering
Hell's Kitchen(NGO), Kharkiv, Ukraine, August 2024
- One-month volunteer experience in Kharkiv, preparing meals and baking bread for hospitals and churches.

Intern in the field of Advanced Development   Internship. Hybrid
Carl Zeiss Meditec AG, Oberkochen, Germany, November 2023 - July 2024
- Six-month researching internship in the field of medical technology, biophysics, and computer vision at Zeiss Meditec.
- Participating in a project focused on intra-operative brain tumor detection from hyperspectral imaging using graph convolutional network techniques.
- Participating in advance development for the project involving intra-operative optical imaging analysis based on radiative transfer equations.

Freelance Translator(German-Japanese)   Freelance, Online
URSA MINOR LTD, Port Louis, Mauritius, December 2022 - November 2023
- Translation of emails from Japanese or German to German and English languages to facilitate communication between software developers and customers.

Teaching Experience

Laboratory and Professional Skills in Physics I: LCR Circuit   Teaching Assistant
School of Mathematics, Statistics and Physics, Newcastle University, Newcastle, UK, Feburary 2025 -
- Supervising and marking the laboratory course of first-year undergraduate students.

Laboratory and Professional Skills in Physics II: Compton Scattering, XRD   Teaching Assistant
School of Mathematics, Statistics and Physics, Newcastle University, Newcastle, UK, October 2024 -
- Supervising and marking the laboratory course of second-year undergraduate students.

Advanced Laboratory in Astrophysics: Laser Safety   Teaching Assistant
Faculty of Physics, Ludwig-Maximilians-Universität München, Munich, Germany, March 2021
- One-month internship and supervising the laboratory course of undergraduate students in the German language.

Summer School & Conference Experience

Parity Violation from Home   Conference participant
Parity Violation from Home, Online, October 2023
- Two weeks of online conference focusing on parity violation in cosmic microwave background, large scale structure, gravitational waves, and theory.

Arnold Sommerfeld School Physics meets AI   Summer school participant
Arnold-Sommerfeld Center for Theoretical Physics, Munich, September 2022
- One week of summer school focusing on applications of machine learning to various fields of physics and theoretical aspects of artificial intelligence.

Scholarships

Postgraduate Scholarship (STFC)   Newcastle, September 2024 –
PhD Studentship
- Awarded a fully funded PhD studentship at Newcastle University for the project *"High-Performance Bayesian Galaxy Inference"*.
- Funding covers full tuition fees for 3 years and a maintenance stipend for 3.5 years at the UKRI rate.

Erasmus Scholarship   Bologna, September 2021 – February 2022
Exchange Student
- Awarded the Erasmus Scholarship from Ludwig-Maximilians-Universität München.
- Participated in a six-month academic exchange at Alma Mater Studiorum – Università di Bologna.

Goethe-Institut Japan Annual Scholarship   Berlin, August 2016 – September 2016
Language Student
- Selected as one of two recipients from Japan for a fully funded Goethe-Institut language scholarship.
- Completed a one-month B1 German language course at the Goethe-Institut Berlin.
- Successfully passed the Goethe-Zertifikat B2 exam.

Coding Skills

Languages: Python, FORTRAN, C++, Java
Python Packages: Numpy, Scipy, Pandas, Astropy, Classy, Healpy

AI software: Keras, Tensorflow, Pytorch, scikit-learn, jax
Astrophysical tool: CLASS, CAMB, FLASK, CosMomentum, DeepSphere, TreeCorr, GLASS

Language Skills

Japanese: Native language
German: DSH-2 Deutsch als Femdsprache (C1), Lectures at Universität Bayreuth were conducted in German.
English: IELTS Overall 6.5 (B2), Lectures at LMU were conducted in English.
Italian: I completed the A1 course at Universität Bayreuth.
Yiddish: I completed the Yiddish-2 course at LMU.