

Se Yeon Hwang

Department of Physics, University of Seoul, Seoul, 02504, Republic of Korea

Phone + 82 1024138638 Email worldhsy@gmail.com

SUMMARY

I have a strong interest in **Cosmology and Large Scale Structure** of the Universe. I worked on utilizing **statistical techniques** and **machine learning algorithms** to extract information from observation and simulation data. I thrive on presenting my findings and engaging with colleagues, all while striving to establish the identity of my research.

EDUCATION

Post-graduate Researcher	Sep.2023 - Current
University of Seoul, Seoul, Republic of Korea	
Physics, MSc (GPA: 4.35/4.5)	Sep.2021 - Aug.2023
University of Seoul, Seoul, Republic of Korea	
• Thesis topic : Applying Transformer Algorithms to Large Scale Structure	
Physics, BSc (GPA: 3.85/4.5)	Mar.2017 - Aug.2021
University of Seoul, Seoul, Republic of Korea	
• Double major in Entrepreneurship	
High School Diploma	Mar.2014 - Feb.2017
YangJu High School, Gyeonggi-do, Republic of Korea	
• Natural Sciences Curriculum with an emphasis on Physics and Chemistry	

RESEARCH

Independent Research	
• <i>Project</i> : team SCOPE (Structure-based Cosmological Parameter Estimation)	Sep.2023 - Current
◦ <i>Member</i> : Dr. Cristiano G. Sabiu, Young Ju, Hannah Jhee, Sumi Kim	
◦ <i>About</i> : Studying the effect of Large Scale Structure Components when Estimating Cosmological Parameters with Machine Learning Algorithms	
Graduate Research	
• <i>Project</i> : team CLML (Cosmology with Large scale structure using Machine Learning)	Jan.2022 - Aug.2023
◦ <i>Academic Supervisor</i> : Dr. Cristiano G. Sabiu, Prof. Inkyu Park	
◦ <i>About</i> : Predicting Cosmological parameters using Machine learning with simulations	
◦ <i>Awards</i> : Poster Award at 2022 105th Korean Astronomical Society spring meeting	
◦ <i>ArXiv</i> : 2304.08192 (Accepted in JCAP, Confirmed Date : 30 Oct.2023)	

- *Project* : team CHOA (Cosmology with Higher Order Astrostatistics) Sep.2021 - Dec.2021
 - *Academic Supervisor* : Dr. Cristiano G. Sabiu, Prof. Inkyu Park
 - *About* : Estimating Cosmological parameters with n-point correlation functions

Undergraduate Research

- *Project* : team CHOA (Cosmology with Higher Order Astrostatistics) Mar.2021-Aug.2021
 - *Academic Supervisor* : Dr. Cristiano G. Sabiu, Prof. Inkyu Park
 - *About* : Studying 2,3,4-point correlation functions with SDSS CMASS data
- *Project* : HAWC (the High-Altitude Water Cherenkov Observatory) Dec.2020-Jun.2021
 - *Academic Supervisor* : Prof. Chang Dong Rho
 - *About* : Studying High-Mass Micro Quasars (Cyg X-1, Cyg X-3)
 - *ArXiv* : 2108.00594 (ICRC 2021 conference paper)

PRESENTATIONS

Invited Speaker

- “*Opening the Black Box : Interpretable Machine Learning in Astronomy*” 20 Oct.2023
presented at 2023 108th Korean Astronomical Society fall meeting

Oral Presentations

- “*Constraining Cosmology using Self-Attention*” presented at Workshop for Korea-UK AI/ML Research in Fundamental Sciences 03 Nov.2022
- “*Cosmology with Self-Attention Algorithms*” presented at 10th Korea Institute for Advanced Study Workshop on Cosmology and Structure Formation 18 Oct.2022
- “*Predicting Cosmological Parameters using CNN and ViT from Large Scale Structure*” presented at 106th Korean Astronomical Society fall meeting 12 Oct.2022
- “*Exploring Two algorithms in Cosmology : CNN and ViT*” presented at 9th Korea Astronomy Machine Learning meeting 30 Aug.2023

Poster Presentations

- “*Deep Learning Approaches to Large Scale Structure*” presented at 2022 General Assembly International Astronomical Union 02-11 Aug.2022
- (Poster Awards) “*Comparing Cosmological Information from Deep Learning and Higher Order statistics*” presented at 105th Korean Astronomical Society spring meeting 13-15 Apr.2022
- “*Detecting the Baryon Acoustic Oscillations in the N-point correlation functions of SDSS Galaxies*” presented at 104th Korean Astronomical Society fall meeting 13-15 Oct.2021
- “*Cosmology with Higher Order Astrostatistics*” presented at 103th Korean Astronomical Society spring meeting 15-16 Apr.2021

RELEVANT EXPERIENCE

Teaching and Mentoring Experiences

- Teaching Assistant for lab class, General Physics Experiment for undergraduate for 4 semesters Sep.2021-Jun.2023
- Tutoring Mathematics for Middle and High School Students Jan.2021-Jun.2021
- Teaching Assistant for elective course, Man, Universe and Civilization for 2 semesters Sep.2020-Jul.2021
- Teaching English and Science Classes for Middle and High School Students at a Private Academy (at G1230FC and Hanssem Academy) Jun.2019-Oct.2019
- Tutoring Science Experiments for Middle School Students Jan.2019-Apr.2019
- Mentoring for Multicultural North Korean Defector at Sangmyeong Elementary School Mar.2018-Jun.2018

Courses on Coding

- Special Lectures on Computational Physics (Graduate) Sep.2021-Dec.2021
- Special Topics in Machine Learning Physics (Graduate) Mar.2021-Jun.2021
- Fundamentals of Programming (Undergraduate) Mar.2021-Jun.2021
- Visualization and Physics (Undergraduate) Sep.2020-Dec.2020
- Physics and Computer II (Undergraduate) Sep.2017-Dec.2017
- Physics and Computer I (Undergraduate) Mar.2017-Jun.2017

Summer Schools

- GMT summer school (1st and 2nd prize in team project) 21-25 Aug.2023
- ALMA summer school 1-4 Aug.2023
- KIAS summer school 2023 Extragalactic and cosmology 18-26 Jul.2023
- Gravitational Waves and Numerical Relativity Winter School 17-21 Jan 2022
- KIAS summer school 2021 Extragalactic and cosmology (online) 19-23 Jul.2021

Scholarships

- Scholarship for Undergraduate Research Assistant Sep.2020-Aug.2021
- Received Korea Student Aid Foundation Scholarship for 8 semesters Mar.2017-Aug.2021
- Korea Student Aid Foundation Scholarship for Multicultural North Korean Defector Mentoring Mar.2018-Jun.2018