

# MYOUNGCHUL KIM

## Data Scientist

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📍 Greater Tokyo, Japan

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## PROJECTS

Search for Ultra-high Energy Neutrinos from Askaryan Radio Array (ARA) by Template Method 🔗

### International Center for Hadron Astrophysics (ICEHAP)

📅 March 2017 – December 2023 📍 Chiba University

- Classified astronomical signal by **statistical-oriented Principal Component Analysis (PCA)**, after obtaining features from **2 billion amounts (~200 TB)** of radio-frequency data that measured below the South Pole.
- Implemented automation solutions for utilizing **large CPU & GPU clusters** by building **Python & C++ packages** to streamline data analysis workflows and enhance productivity.
- Implemented physics techniques, such as the **Fast Fourier Transform (FFT)**, **Interferometry**, and the **Matched Filter**, into the package for **feature extraction**.
- Optimized the PCA based on **Frequentist Statistics** and **Pseudo Experiment**.
- Analyzed & quantified results by calculating **statistical significance**, including **systematic uncertainty**, and **Monte Carlo simulation**.

Sound to Symphony (AI Music Generation) 🔗

### Le Wagon Data Science & AI Bootcamp

📅 January 2024 – March 2024 📍 Le Wagon, Tokyo

- Generates completely new music by **Recurrent Neural Network (RNN)** that can be easily customizable by musical software
- Architectures RNN model for learning musical patterns** from large classical music datasets that are expressed in numerical format.
- Deployed the project into the **Streamlit** by utilizing **FastAPI**
- Built the connection between generated music and musical software Abelton

## EXPERIENCE

Graduate Research Assistant

### Chiba & SungKyunKwan University

📅 2015 – 2023 📍 Japan & South Korea

- Performed **high-precision calibration for the radio-frequency antenna** for an advanced research instrument.
- Established **scientific Python & C++ hybrid package**, inspired by C++-based code, that extracts physics results from raw data, leading to **wide use by international collaborators**.
- Learned **large database management**, including optimization of data sourcing and efficient connection to supercomputer by using solid analysis pipeline.
- Practiced a thorough way to **evaluate the project results by using statistical techniques** and the **back-of-the-envelope calculation**.

## ABOUT ME

*I'm an Astrophysicist used to analyzing large datasets to find astronomical signals and recently graduated from Le Wagon Data Scientist & AI boot camp. Seeking to utilize programming skills backed by my scientific background and data science knowledge.*

## TECHNICAL SKILLS

### Coding Tools

Python C++ Vim HTCondor  
CVMFS G-Collab & Jupyter Latex

### Data Analytics

NumPy SciPy Scikit-learn Pandas  
SQL Matplotlib Seaborn

### Modelling

TensorFlow Deep Learning  
Unsupervised Learning NLP CNN  
Time series Ensemble Methods  
Statsmodels

### Deployment

GCP Docker FastAPI Streamlit

### Hardware Experience

Electronics Optics

## LANGUAGES

English **Fluent**

Japanese **JLPT N1, Fluent**

Korean **Native**

## INTERESTS

Classical Music  
Orchestra Contrabass  
Universe Fourier Transform

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## Teaching & Operating Assistant

### Chiba & SungKyunKwan University

📅 2015 – 2018

📍 Japan & South Korea

- Guided Korean students are transitioning to undergraduate studies at Japanese universities by **teaching freshman-level physics and mathematics courses in Japanese**.
- Provided mentorship to students, aiding them in achieving academic success in challenging physics courses. Conducted hands-on physics experiments with students, enhancing their practical knowledge and skills. **Managed scientific equipment** to ensure smooth and successful experiment execution.

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## Japanese to English & Korean Translator

### Wovn.io

📅 2018

📍 Tokyo

- Provided translation services and real-time deployment for the client company website written in Japanese, incorporating cultural nuances to enhance readability and accessibility.

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## EDUCATION

### Data Science & AI Bootcamp

#### Le Wagon

📅 January 2024 – March 2024

📍 Japan

- Thorough study in Python for Data Science, with expertise in data extraction, manipulation, and visualization, backed by a strong foundation in statistics and linear algebra.
- Delving into Machine Learning and Deep Learning, with practical application in building comprehensive workflows utilizing Scikit-Learn and designing neural network architectures.
- Proficiency in ML Engineering, involving the development of Python packages for large-scale data tasks in GCP, and a deep awareness of the ethical considerations surrounding AI deployment.

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## Completion of Ph.D. program (ABD), Physics

### Chiba University

📅 April 2017 – December 2023

📍 Japan

- Research topic: Search for Ultra-high Energy Neutrinos Using Eight Years of Data from Two ARA Stations by the Neutrino Template Method

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## Master of Science, Physics

### SungKyunKwan University

📅 March 2015 – February 2017

📍 South Korea

- Thesis title: Performance study of camera system for the IceCube-Gen2 detector

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## Bachelor in Science, Physics

### SungKyunKwan University

📅 March 2011 – February 2015

📍 South Korea

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## AWARDS



**Japanese Government Monbukagakusho Scholarship (MEXT)**  
Graduate Research Assistant in Ph.D., 2017 – 2020



**Teaching Assistant (T.A.) of Korea & Japan Joint Government Scholarship**  
Teaching Assistant for a freshman Korean students, 2017 – 2018



**BK21+ Research student scholarship**  
Graduate Research Assistant in Msc., 2015 – 2017



**Operating Assistant scholarship**  
Physics Experiment Assistant, 2016 – 2017



**CK Research student scholarship**  
Research Assistant in Bsc., 2014

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## SELECTED PUBLICATIONS



### Journal Articles

- P. Dasgupta, M. S. Muzio, *et al.*, “Progress Towards a Diffuse Neutrino Search in the Full Livetime of the Askaryan Radio Array,” *PoS*, vol. ICRC, p. 1226, 2023.
- M. Kim *et al.*, “Enhanced Ultra-High Energy Neutrino Search at the Askaryan Radio Array using Template-based Techniques,” *PoS*, vol. ICRC, p. 1148, 2023.