

# KIHO PARK

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## Research Interests

Mechanistic Interpretability, Large Language Models (LLMs), Representation Learning, Information Geometry

## Education

### University of Chicago

*PhD in Statistics*

Sep 2021 – Present

GPA: 4.0 / 4.0

- Advisor: Victor Veitch
- Committee: Rina Foygel Barber, Ari Holtzman

### Seoul National University

*BS in Statistics and Mathematical Sciences*

Mar 2015 – Jun 2021

GPA: 4.12 / 4.3 (*Summa Cum Laude*)

- Advisor: Sungkyu Jung

## Publications

### The Geometry of Categorical and Hierarchical Concepts in Large Language Models | [link](#) 2024

- K. Park, Y. J. Choe, Y. Jiang, and V. Veitch
- **Oral (Top 1.8%)** Presentation at *ICLR 2025*
- **Best Paper Award** at *ICML 2024 Workshop on Mechanistic Interpretability (MI)*
- Poster Presentation at *ICML 2024 Workshop on Theoretical Foundations of Foundation Models (TF2M)*

### The Linear Representation Hypothesis and the Geometry of Large Language Models | [link](#) 2023

- K. Park, Y. J. Choe, and V. Veitch
- Poster Presentation at *ICML 2024*
- Oral Presentation at *NeurIPS 2023 Workshop on Causal Representation Learning (CRL)*

### Clustering on the Torus by Conformal Prediction | [link](#) 2021

- S. Jung, K. Park, and B. Kim
- *Annals of Applied Statistics*, vol. 15, no. 04, p. 1583 - 1603

### Multiplication of Integral Octonions | [link](#) 2016

- M. S. Kim, Y. Kim, J.-H. Lee, S. Nam, and K. Park
- *Journal of Algebra and Its Applications*, vol. 15, no. 08, p. 1650144

## Preprint

### Incorporating Hierarchical Semantics in Sparse Autoencoder Architectures | [link](#) 2025

- M. Muchane, S. Richardson, K. Park, and V. Veitch

## Research Experience

### Victor Veitch's Lab

*Graduate Research Assistant, advised by Victor Veitch*

Sep 2022 – Present

*University of Chicago*

- Formalized the linear representation hypothesis in LLMs and introduced the concept of a 'causal inner product' that unifies the different notions of linear representations
- Formalized the representations of categorical concepts in LLMs as polytopes, and showed that hierarchical relations between concepts are represented as orthogonality

### Netflix

*Internship in Machine Learning & Inference Research Team*

Sep 2024 – Feb 2025

*New York City*

- Developed a transformer-based point process model for high-dimensional event history data
- Mentored by James McInerney and Michael Lindon; supervised by Nathan Kallus

### ML Alignment & Theory Scholar (MATS)

*Research Scholar*

Oct 2024

*Berkeley*

- Conducted research on the mechanistic understanding of reasoning in LLMs, in collaboration with Bruce W. Lee

### Statistical Learning Theory Lab

*Undergraduate Research Assistant, advised by Sungkyu Jung*

Jun 2019 – Aug 2020

*Seoul National University*

- Created a novel clustering approach on the torus using the conformal prediction framework
- Constructed R code that allows others to apply the clustering method to data on the torus

## Talks

Invited Talk at Insight + Interaction Lab	10.03.2025
Invited Talk at Najoung Kim's Reading Group	10.02.2025
Invited Talk at AI in Biomedicine Journal Club	08.28.2025
Invited Talk at Brett Beaulieu-Jones Lab Meeting	07.21.2025
Panel Discussion at KSEA IMPACTs 2025 (Advancing AI)	03.29.2025
Lightning Talk at KSEA UChicago Research Day	03.01.2025
Invited Talk at CMSC 37712 (Machine Learning and AI, invited by Ari Holtzman)	02.20.2025
Lightning Talk at DSI PhD Student Research Day	12.06.2024
Oral Presentation at US-Korea Conference (UKC 2024)	08.22.2024
<b>Oral Presentation at ICML 2024 MI workshop</b>   <a href="#">link</a>	07.27.2024
Invited Talk at STAT 37400 (Nonparametric Inference, invited by Claire Donnat)	05.09.2024
Invited Talk at LLM Reading Group Seminar   <a href="#">link</a>	03.05.2024
Invited Talk at Topology, algebra, and geometry in Data Science (TAG-DS) Seminar	02.27.2024
<b>Oral Presentation at NeurIPS 2023 CRL workshop</b>   <a href="#">link</a>	12.15.2023

## Honors and Scholarships

Best Paper Award ( <i>ICML 2024 Workshop on Mechanistic Interpretability</i> )	2024
Best Poster Award 1st Place on Student Research Poster Day ( <i>University of Chicago</i> )	2024
The Winter 2023 Consulting Cup Team Award ( <i>University of Chicago</i> )	2023
SNUAA Chicago Scholarship ( <i>Seoul National University Alumni Association in Chicago</i> )	2022
The First Annual Takintayo Akinbiyi Memorial Award ( <i>University of Chicago</i> ) ( <i>Awarded for ranking 1st among 12 first-year PhD students in Statistics</i> )	2022
Dean's List ( <i>Seoul National University</i> )	2018 – 2020
National Scholarship for Science and Engineering ( <i>Korea Student Aid Foundation</i> )	2015 – 2020

## Teaching Experience

### Teaching Assistant, University of Chicago

• Instructor for Theoretical Statistics Preliminary Examination	Summer 2024, Summer 2023
• STAT 30200: Mathematical Statistics II	Spring 2023
• STAT 32950: Multivariate Statistical Analysis	Spring 2023, Spring 2022
• STAT 23400: Statistical Models and Methods	Fall 2022
• STAT 30040: Statistical Theory and Methods IIa	Winter 2022

### Tutor, Seoul National University

• 326.311: Mathematical Statistics I ( <i>Best tutor award</i> )	Spring 2021
• 326.312: Mathematical Statistics II	Fall 2020

## Service

### Peer Review

- ICLR 2026, NeurIPS 2025, ICML 2025, ICLR 2025, NeurIPS 2024, ICML 2024 TF2M Workshop, ICML 2024, ICLR 2024, CLear 2024, NeurIPS 2023 CRL Workshop, ICML 2023 Workshop SCIS, NeurIPS 2023

### Mentoring

**Jun 2024 – Sep 2024**

*UChicago Existential Risk Lab Fellowship*

*Chicago*

- Mentored Anastasia Wei (undergraduate student at Northwestern University) on interpretability in LLMs
- Conducted research on mechanistic understanding of semantically similar sentences in LLMs

## Leadership & Organizations

### University of Chicago Korean Graduate Student Association (KGSA)

**Jun 2024 - May 2025**

*Vice President*

*Chicago*

- Developed a community website for graduate students to facilitate convenient information exchange and archiving
- Planned and managed events including pre-arrival orientation, welcome party, BBQ party, and research day

### Korean National Police Agency

**Nov 2016 – Aug 2018**

*Auxiliary Police in 43 Company*

*Seoul*

- Led 30 members in managing the sites of demonstrations, including labor union protests and the Candlelight Demonstrations for the resignation of President Park Geun-hye
- Managed event sites, including Seoul Queer Culture Festival and 2018 PyeongChang Olympics