

Education

Ph.D. in Statistics and Operations Research , University of North Carolina at Chapel Hill (UNC)	Chapel Hill, NC
• Advisor: Dr. Vlasdas Pipiras	Aug 2021 – May 2026
M.S. in Statistics , Seoul National University (SNU)	Seoul, South Korea
• Advisor: Dr. Hee-Seok Oh	Mar 2019 – Feb 2021
B.S. in Statistics, Minored in Computer Science and Engineering , Seoul National University (SNU)	Mar 2015 – Feb 2019

Work Experience

Google Software Engineer Intern Google Research	San Francisco, CA
• Designed and implemented a factuality evaluation metric for Gemini outputs, using Python/Colab .	May 2025 – Aug 2025
• Collaborated with Google Research scientists to validate the metric against human raters and existing approaches.	
Moloco Software Engineer Research Intern	Seattle, WA
• Designed and conducted experiments with exploration strategies for digital ads bidding models.	May 2023 – Aug 2023
• Identified a critical data distribution shift and proposed and developed a reweighting strategy (arXiv) using SQL and Python .	
Lawrence Livermore National Laboratory (LLNL) NSF Mathematical Sciences Graduate Intern	Livermore, CA
• Developed data-driven methods in <i>libROM</i> , a scalable C++ library, to accelerate physics simulation.	May 2022 – Jul 2022

Research Experience

Focus: Statistical and ML methods for physical simulations (e.g., climate, naval) as well as spatio-temporal and time-series analysis.

Multi-fidelity modeling (UNC) [2,3,5,6]

- Developed statistical methods to combine multi-fidelity simulation outputs (varying in accuracy and cost) for efficient estimation of distribution of limited high-fidelity outputs in **R**. Approaches: importance sampling, multi-fidelity Monte Carlo

AI for Science: solving spatio-temporal PDEs (UNC) [4]

- Applied physics-informed neural networks (PINNs) with latent space FourierNet to approximate PDE solutions in **PyTorch**.

Spatio-temporal (ST) analysis of Particular Matter data (SNU)

- Projected ST data into a latent space for [quantile analysis](#), forecasting, and missing data prediction using EM algorithm.

Multi-scale time-series clustering (SNU) [7] applied to large-scale step count data from wearable devices and COVID-19 data.

Course Projects (UNC) [Generative diffusion models](#) / [Undergraduate Research Intern \(SNU\) MRI Stroke Lesion Segmentation](#)

Teaching Experience

Instructor [UNC] STOR 155, Introduction to Data Models and Inference (24F)

Teaching Assistant [UNC] Statistical Theory (25F), Introduction to Deep Learning (22Sp), Methods of Data Analysis (22Sp, 21F), [SNU] Sampling Design and Survey (20F), Design and Analysis of Experiments (20Sp), Statistics Lab (20Sp, 19F)

Selected Honors and Awards

Cambanis-Hoeffding-Nicholson Award (2022) UNC, for outstanding academic performance in first-year doctoral program.

NSF Mathematical Sciences Graduate Internship (2022) Oak Ridge Institute for Science and Education.

Korean Government Scholarship for Overseas Study (2021, \$80K) Korean Government, 5 students in the Intelligent Infrastructure field selected nationwide for a doctoral study abroad program.

The Presidential Science Scholarship (2015, Tuitions and incentives) Top national scholarship for outstanding STEM students.

Publications

- [1] A. Larsson et al., ‘Survey on quadrature point selection in hyper-reduced order models for finite element methods’, Preprint.
- [2] **M. Kim**, B. Brown, V. Pipiras, (2025), ‘[Parametric multi-fidelity Monte Carlo estimation with applications to extremes](#)’, *Technometrics*, accepted.
- [3] **M. Kim**, K. O’Connor, V. Pipiras, T. Sapsis, (2025), ‘[Sampling low-fidelity outputs for estimation of high-fidelity density and its tails](#)’, *SIAM/ASA Journal on Uncertainty Quantification*, **13**, pp. 30–62.
- [4] **M. Kim**, T. Wen, K. Lee, Y. Choi, (2024), ‘[Physics-informed reduced order model with conditional neural fields](#)’, *NeurIPS 2024 Workshop on Machine Learning and the Physical Sciences*.
- [5] **M. Kim**, V. Pipiras, T. Sapsis. (2024), ‘Statistical Reduced-Order Modeling of Peaks of Vertical Bending Moment in Irregular Waves’, *Proceedings of the 35th Symposium on Naval Hydrodynamics (SNH)*, Nates, France.
- [6] **M. Kim**, V. Pipiras, A. Reed, K. Weems, (2023), ‘[Calibration of low-fidelity ship motion programs through regressions of high-fidelity forces](#)’, *Ocean Engineering* **290**, 116321.
- [7] **M. Kim**, H. Oh, and Y. Lim, (2023), ‘[Zero-Inflated Time-Series Clustering Via Ensemble Thick-Pen Transform](#)’, *Journal of Classification* **40**, pp. 407–431.

Technical Skills

Languages: Python, R, C++, Julia, SQL **ML/AI:** PyTorch, JAX, TensorFlow **Tools:** Git, Bash, slurm, CUDA, dplyr, NumPy, ggplot2