Minji Kim

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Education

Ph.D. in Statistics and Operations Research, University of North Carolina at Chapel Hill (UNCCH) — *Chapel Hill, NC*, *Aug 2021 – May 2026*
- Advisor: Dr. Vladas Pipiras

M.S. in Statistics, Seoul National University (SNU) — *Seoul, South Korea*, *Mar 2019 – Feb 2021*
- Advisor: Dr. Hee-Seok Oh

B.S. in Statistics, Minored in Computer Science and Engineering, Seoul National University (SNU) — *Mar 2015 – Feb 2019*

Research Experience

Multi-fidelity modeling (UNCCH) developed statistical methods to leverage computer models of varying fidelities, resulting in 3+ works on calibration, importance sampling and ensemble estimators (also known as semi-supervised learning for partially labeled data.)

Physics-informed Neural Networks (UNCCH) reduced order modeling for approximating parametrized (spatio-temporal) PDE solutions conditionally on low-dimensional latent states, leveraging coordinate-based NNs and Neural ODEs using **PyTorch** and **python**.

Spatio-temporal analysis of particular matter (SNU) forecast and missing data imputation via dynamic factor model and EM algorithm.

Zero-inflated Time-series clustering (SNU) Applied to 1440-dimensional **step count data** from wearable devices and **COVID-19 data**.

Work Experience

Moloco, Software Engineer Research Intern — Seattle, WA, May 2022 – Aug 2022
- Extracted and analyzed large-scale data using **SQL** to simulate and infer outcomes.
- Researched on exploration strategies and distribution shifts for real-time bidding price prediction models for online ads.

Lawrence Livermore National Laboratory (LLNL), NSF Mathematical Sciences Graduate Intern — remote, Livermore, CA, May 2021 – Jul 2021
- Contributed to *libROM*, a lightweight, scalable **C++** library for nonlinear dynamical problems.
- Gained hands-on experience with data-driven large-scale physics simulation codes utilizing MPI-based parallel computing.

Publications

S. Cheung et al., 'Survey on quadrature point selection in hyper-reduced order models for finite element methods' (In prep).

M. Kim, B. Brown, V. Pipiras, 'Parametric multi-fidelity Monte Carlo estimation with applications to extremes', submitted.

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* (to appear).

M. Kim, K. O'Connor, V. Pipiras, T. Sapsis, (2024+), 'Sampling low-fidelity outputs for estimation of high-fidelity density and its tails', *SIAM/ASA Journal on Uncertainty Quantification* (to appear).

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.

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.

M. Kim, H. Oh, and Y. Lim, (2023), 'Zero-Inflated Time-Series Clustering Via Ensemble Thick-Pen Transform', *Journal of Classification* **40**, 407–431.

Selected Honors and Awards

- **SIAM and UNCCH Travel Awards (2024)** for attending the SIAM UQ24 conference.
- **Cambanis-Hoeffding-Nicholson Award (2022)** UNCCH, for outstanding academic performance in first-year doctoral program.
- **NSF Mathematical Sciences Graduate Internship (2022, $ 12,000)** Oak Ridge Institute for Science and Education.
- **Korean Government Scholarship for Overseas Study (2021, $ 80,000)** Korean Government, 5 students in the Intelligent Infrastructure field selected nationwide for a doctoral study abroad program.
- **The Presidential Science Scholarship (2015, Tuition and incentives)** Top national scholarship for outstanding STEM students.

Teaching Experience

Instructor: STOR 155 Introduction to Data Models and Inference (2024F, UNCCH)

Teaching Assistant: Introduction to Deep Learning (2022Sp, UNCCH), Methods of Data Analysis (2022Sp, 2021F, UNCCH), Sampling Design and Survey (2020F, SNU), Design and Analysis of Experiments (2020Sp, SNU), Lab (2020Sp, 2019F, SNU)

Technologies

Languages: Julia, R, Python, C++, C, Java, SQL. **Development Tools:** Git, Linux, Bash, LaTeX, slurm, CUDA.
Machine Learning: PyTorch, TensorFlow, scikit-learn, glmnet. **Data Analysis:** dplyr, NumPy, ggplot2, Matplotlib, Seaborn.