HEEJONG BONG

Special Faculty – Postdoctoral Researcher
Department of Statistics and Data Sciences
Carnegie Mellon University, Pittsburgh, PA, USA
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RESEARCH INTERESTS

Spatiotemporal methods, Graphical models, Causal inference from time-series data, High-dimensional central limit theorem and bootstrap, Ranking from pairwise comparisons

ACADEMIC POSITION

Carnegie Mellon University Pittsburgh, PA
Postdoctoctoral Researcher 2022 - 2023
Collaborators: *Robert E. Kass*, *Valérie Ventura*, *Larry Wasserman*, *Alessandro Rinaldo* and *Arun Kumar Kuchibhotla*

EDUCATION

Carnegie Mellon University Pittsburgh, PA
Ph.D. Statistics and Data Science 2017 - 2022
Dissertation: *Discovery of Functional Predictivity across Brain Regions from Local Field Potentials*
Dissertation advisors: *Robert E. Kass* and *Valérie Ventura*

Seoul National University Seoul, Republic of Korea
B.Sc., Mathematics 2011 - 2017

PUBLICATIONS

Published

Bong, H. & Rinaldo, A. (2022). Generalized results for the existence and consistency of the MLE in the Bradley-Terry-Luce model. In *International Conference on Machine Learning* (pp. 2160-2177). PMLR.

Bong, H., Liu, Z., Ren, Z., Smith, M., Ventura, V. & Kass, R. E. (2020). Latent dynamic factor analysis of high-dimensional neural recordings. *Advances in Neural Information Processing Systems*, 33, 16446-16456.

Bong, H., Li, W., Shrotriya, S. & Rinaldo, A. (2020). Nonparametric estimation in the dynamic Bradley-Terry model. In *International Conference on Artificial Intelligence and Statistics* (pp. 3317-3326). PMLR.

Submitted

Kass, R. E., **Bong, H.**, Olarinre, M., Xin, Q. & Urban, K. (2023). Identification of Interacting Neural Populations from Multiple-Electrode Recordings.

Bong, H. & Kuchibhotla, A. K. (2023). Tight Concentration Inequality for sub-Weibull Random Variables with Generalized Bernstien Orlicz norms. *arXiv preprint arXiv:2302.03850*

Bong, H., Ventura, V., Yttri, E. A., Smith, M. A. & Kass, R. E. (2023). Cross-Population Amplitude Coupling in High-Dimensional Oscillatory Neural Time Series. *arXiv preprint arXiv:2105.03508.*

Urban, K., **Bong, H.**, Orellana, J. & Kass, R. E. (2022). Oscillating neural circuits: Phase, amplitude, and the complex normal distribution.

In Preparation

Bong, H., Ventura, V. & Wasserman, L. (2023). Inference for Semi-Mechanistic Epidemic Models with Interventions.

Bong, H., Kuchibhotla, A. K. & Rinaldo, A. (2023). High-dimensional Berry-Esseen Bound for m-Dependent Random Samples. *arXiv preprint arXiv:2105.03508.*

Liu, Z.*, **Bong, H.***, Ren, Z. & Kass, R. E. (2023). Simultaneous Inference in Multiple Matrix-Variate Graphs for High-Dimensional Neural Recordings.

PRESENTATIONS

Center for AI and Natural Sciences, Korean Institute for Advanced Study, ‘‘Discovery of functional predictivity across brain regions from local field potentials.” September 2022, Seoul, Korea.

International Conference on Machine Learning, *“Generalized results for the existence and consistency of the MLE in the Bradley-Terry-Luce model.”* July 2022, Baltimore, MD.

Advances in Neural Information Processing Systems, *“Latent dynamic factor analysis of high-dimensional neural recordings.”* December 2020, online.

International Conference on Artificial Intelligence and Statistics, *“Nonparametric estimation in the dynamic Bradley-Terry model.”* August 2020, online.

Carnegie Mellon Sports Analytics Conference, *“Time-Varying Bradley Terry Ranking Model with Penalized Estimation.”* November 2019, Pittsburgh, PA.

Ninth International Workshop Statistical Analysis of Neuronal Data, *“Linear Factor Model for Discovering Lead-Lag Relationship between Two Brain Areas.”* May, 2019. Pittsburgh, PA.

GRANTS AND AWARDS

1st Place in Reproducible Research Paper Competition, Carnegie Mellon Sports Analytics Conference . . . 2019
Undergraduate Research Project Fellowship, Seoul National University ($3,000) 2016
Korea National Scholarship for Science and Engineering ($10,000 per year) 2011-2012,2015-2016

RESEARCH EXPERIENCE

Central Limit Theorems for High-dimensional Dependent Samples
Postdoctoral Research 2022
Collaborators: Arun Kumar Kuchibhotla and Alessandro Rinaldo

Optimal Concentration Inequalities for Sums of Sub-Weibull Random Variables
Independent Research 2022
Collaborator: Arun Kumar Kuchibhotla

Frequentist Causal Inference for Semi-mechanistic Epidemic Models with Interventions
Delphi Research Group 2022
Project PIs: Valérie Ventura and Larry Wasserman

Simultaneous Inference in Multiple Matrix-Variate Graphs for High-Dimensional Neural Recordings
Independent Research 2022
Collaborators: Zongge Liu, Zhao Ren, and Robert E. Kass

Theoretical Analyses on Pair-wise Comparison Data and Ranking Models
Independent Research 2019-2022
Collaborators: Wanshan Li, Shamindra Shrotrya, and Alessandro Rinaldo

Discovery of Functional Predictivity across Brain Regions from Local Field Potentials
Dissertation Research 2019 - 2022
Advisors: Robert E. Kass and Valérie Ventura

Statistical Analysis on Neural Activity of Rodents' Motor System during Reinforcement Experiment
Advanced Data Analysis 2018
Advisors: Robert E. Kass and Eric Yttri

SOFTWARE PACKAGES

MMGE
Multiple Matrix-variate Graph Estimation 2022

LaDynS
Latent Dynamic Analysis via Sparse Banded Graphs 2021

LDFA-H
Latent Dynamic Factor Analysis for High-dimensional Time Series 2020

TEACHING EXPERIENCE

Teaching Assistant

Carnegie Mellon University Pittsburgh, PA
Department of Statistics and Data Science 2017-2022

Advanced Statistical Theory, Intermediate Statistics, Probability and Mathematical Statistics, Probability Theory and Random Processes, Undergraduate Advanced Data Analysis, Introduction to Probability Theory (2X), Introduction to Statistical Inference

Seoul National University Seoul, Republic of Korea
Department of Mathematics 2017
Sets and Mathematical Logics

Tutor

Seoul National University Seoul, Republic of Korea
Department of Mathematics 2015
Calculus for Life Science 1

Volunteered Tutor

Seoul National University Seoul, Republic of Korea
Undergraduate Student Assembly, Department of Mathematcis 2015
Introduction to Mathematical Analysis 1, 2

TECHNICAL

Programming
R, Python, FORTRAN, MATLAB, and LaTeX