CHEOLJOON JEONG, PH.D. CANDIDATE

CONTACT INFORMATION

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RESEARCH INTERESTS

Data Science, Simulation, and Optimization with Applications to Energy, Manufacturing, and Healthcare Systems

- **Methodologies:** design and analysis of computer experiments, statistical learning, machine learning, nonlinear optimization, survival analysis, artificial intelligence
- **Applications:** digital twin calibration, quality and reliability engineering (condition monitoring, diagnostics, prognostics, anomaly detection), operational decision-making

EDUCATION

University of Michigan, Ann Arbor, MI — 9/2020 – Present
Ph.D., Industrial and Operations Engineering
– Dissertation: Digital Twin Calibration in the Era of Big Data
– Advisor: Dr. Eunshin Byon
M.A., Statistics

North Carolina State University, Raleigh, NC — 8/2018 – 5/2020
M.Eng., Industrial and Systems Engineering
– Advisor: Dr. Xiaolei Fang

Yonsei University, Seoul, Korea — 3/2009 – 2/2016
B.S., Information and Industrial Engineering

RESEARCH POSITIONS

Research Assistant, University of Michigan — 9/2020 – Present
- Title: Digital Twin Calibration in the Era of Big Data
- Developed a new multi-block calibration approach using a nonlinear optimization technique reconciled with statistical theories for uncertainty quantification, which guides the sequential design of computer experiments
- Devised a novel stochastic dimensionality reduction-based calibration method for high-dimensional parameters with explainability and extended the framework to be applicable for a wide range of problems, including functional calibration problems

Research Assistant, North Carolina State University — 1/2019 – 5/2020
- Title: Quality Fault Diagnostics Using Multi-Steam High-Dimensional Signals
- Proposed matrix- and tensor-based quality fault diagnostic methods that automatically identify informative process variables and stages in a multi-stage hot rolling mill in the steel-making industry using newly developed regularization formula and efficient optimization algorithms

HONORS AND AWARDS

- Best Student Paper Award Finalist, QSR Section, INFORMS — 2024
- Institute for Energy Solutions Graduate Fellowship, University of Michigan — 2024
- Richard C. Wilson Best Paper Prize, University of Michigan — 2023
- Seth Bonder Fellowship Winner, University of Michigan — 2021 – 2022
- Rackham Travel Grant, 4 times, University of Michigan — 2021 – 2024
- Best Paper Award Finalist, DAIS Division, ISERC — 2021
- Best Student Paper Award Winner, QCRE Division, ISERC — 2020
- IOE Departmental Fellowship, University of Michigan — 2020 – 2021
- Edward P. Fitts Fellowship, North Carolina State University — 2019 – 2020
- Korea National Science and Technology Scholarship, KOSAF — 2013 – 2016
- Academic Excellence Awards, 4 times, Yonsei University — 2010 – 2015
- Commandant's List in the Warrior Leader Course, Eighth U.S. Army — 2012

Working Papers

[P1] **Jeong, C.** & Byon, E., Nonparametric Functional Calibration with Multivariate Factors, In Preparation.

[P2] **Jeong, C.** & Byon, E., Direction-Dependent Functional Calibration for Wake Effect Models in Multi-Turbine Wind Farms, In Preparation.

Refereed Journal Publications

[J1] **Jeong, C.** & Byon, E., Explainable Parameter Calibration via Importance-Driven Sliced Sequential Design, Under Review at *Technometrics*.
- **Finalist, Best Student Paper Award in the QSR Section, INFORMS, 2024**

[J2] **Jeong, C.**, Byon, E., He, F., & Fang, X., Tensor-Based Statistical Learning Methods for Diagnosing Product Quality Defects, To appear in *IISE Transactions*, 2024.
doi: https://doi.org/10.1080/24725854.2024.2385670

[J3] **Jeong, C.** & Byon, E., Calibration of Building Energy Computer Models via Bias-Corrected Iteratively Reweighted Least Squares Method, *Applied Energy*, 360, 122753, 2024.
doi: https://doi.org/10.1016/j.apenergy.2024.122753

[J4] **Jeong, C.**, Xu, Z., Byon, E., Berahas, A. S., & Cetin, K., Multi-Block Parameter Calibration in Computer Models, *INFORMS Journal on Data Science*, 2:2, 116-137, 2023.
doi: https://doi.org/10.1287/ijds.2023.0029
- **Winner, Richard C. Wilson Prize, University of Michigan, 2023**

[J5] **Jeong, C.** & Fang, X., Two-Dimensional Variable Selection and Its Applications in the Diagnostics of Product Quality Defects, *IISE Transactions*, 54:7, 619-629, 2022.
doi: https://doi.org/10.1080/24725854.2021.1904524
- **Winner, Best Student Paper Award in the QCRE Division, ISERC, 2020**

Refereed Conference Proceedings

[C1] Xu, Z., **Jeong, C.**, Byon, E., & Cetin, K., Season-Dependent Parameter Calibration in Building Energy Simulation, *Proceedings of the 2021 IISE Annual Conference*.
- **Finalist, Best Paper Award in the DAIS Division, ISERC, 2021**

Technical Report

[T1] **Jeong, C.**, The Effect of Real Estate Auction Events on Mortality Rate (Korean), CRO Report, *Credit Insight*, Summer Vol., 22-34, 2017.

Invited Talks

- Explainable Parameter Calibration via Sliced Sequential Design
  - INFORMS Annual Meeting, Seattle, WA (Expected) 2024
  - IISE Annual Conference, Montréal, Canada 2024
  - INFORMS Annual Meeting, Phoenix, AZ 2023
  - INFORMS DMDA Workshop, Phoenix, AZ 2023
- Multi-Block Parameter Calibration in Computer Models
  - Hyundai Vision Conference (Poster), Seoul, Korea 2023
  - INFORMS Conference on QSR, Raleigh, NC 2023
  - INFORMS Annual Meeting, Indianapolis, IN 2022
  - IMS/ASA Spring Research Conference, Virtual 2022
- Modularized Bias-Corrected Parameter Calibration
  - Institute of Energy Solutions, Ann Arbor, MI 2024
  - MSSISS Statistical Symposium, Ann Arbor, MI 2024
  - INFORMS Annual Meeting, Indianapolis, IN 2022
- Season-Dependent Parameter Calibration in Building Energy Models
  - INFORMS Annual Meeting, Anaheim, CA/Virtual 2021
  - IEEE CASE Conference, Lyon, France/Virtual 2021
  - IISE Annual Conference, Virtual 2021

- Two-Dimensional Variable Selection and Its Applications in the Diagnostics of Product Quality Defects
  - IISE Annual Conference, Virtual 2020

Teaching Experience

Graduate Student Instructor, University of Michigan 8/2022 – 12/2024
- IOE 461: Quality Engineering Principles and Analysis, Fall 2024 (Ongoing)
- IOE 565: Time Series Analysis, Winter 2024 (Eval: 4.7/5)
- IOE 591: Statistical Learning for Data Science, Fall 2023 (Eval: 4.9/5)
- IOE 591: Introduction to Data Analytics, Fall 2022 (Eval: 4.5/5)

Teaching Assistant, North Carolina State University 8/2018 – 5/2019
- ISE 361: Deterministic Models in OR, Spring 2019
- ISE 311: Economic Decision Analysis, Fall 2018

Professional Experience

Data Scientist, National Information and Credit Evaluation 1/2016 – 6/2018
- Developed a new business based on large-scale real estate data
- Established credit scoring models to predict financial risks such as debts and delinquencies using real estate auction data

KATUSA Soldier, Eighth U.S. Army 3/2011 – 12/2012
- Managed an effective training program with the U.S. Commander
- Honorably discharged as a sergeant

Relevant Coursework

- Statistics: Probability and Distribution Theory, Statistical Inference, Regression Analysis, Statistical Learning, Monte Carlo Methods, Bayesian Inference, Time Series Analysis, Categorical Data Analysis, Statistical Theory
- Operations Research: Linear Programming, Nonlinear Programming, Stochastic Programming, Dynamic Programming, Convex Optimization, Stochastic Process I-II, Stochastic Simulation, Functional Analysis

Technical Skills

- Computer Programming: R, Python, MATLAB, SAS, C, MySQL, Prolog, LaTeX
- Solver: Gurobi, CPLEX, CVX

Services

- Session Chair and Organizer, INFORMS Annual Meeting
  - Recent Advances in Design and Analysis of Computer Experiments (E) 2024
  - Modern Design and Analysis of Computer Experiments 2023
  - Applied Paper Presentation for DMDA Workshop 2023
- Faculty Advisor, Engineering Honors Capstone Project, University of Michigan 2024
- Vice President, Yonsei-Michigan Student Association 2023 – 2024
- President, Michigan IOE Korean Student Association 2023 – Present
- Mentor, Graduate Application Mentoring Program, University of Michigan 2023
- Department Representative, MSSISS, University of Michigan 2021 – 2022
- Team Leader, Global Engineer Program, Yonsei University 2014
- Officer, Supply Chain Student Society (MSC), Yonsei University 2010 – 2011
- Staff, University Student Unions, Yonsei University 2009

References

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Dr. Xiaolei Fang (e-mail: xfang8@ncsu.edu; phone: +1-919-515-0312)
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Dr. Judy Jin (e-mail: jhjin@umich.edu; phone: +1-734-763-0519)
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