Curriculum Vitae

Seokhyun Chung, Ph.D.

CONTACT INFORMATION

Assistant Professor (tenure-track)
Systems & Information Engineering
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RESEARCH INTERESTS

My research interests lie in the intersection of **data science**, **machine learning**, and **optimization**. Specifically, I focus on **Artifical Intelligence (AI)-driven analytics for smart & connected systems**, exploring collaborative and distributed analytics where Internet of Things-enabled entities (e.g., smartphones, electric vehicles, and wearable devices) exploit their edge computing power to build smart analytics collaboratively.

- **Methodologies**: Federated analytics, Bayesian probabilistic modeling, and Real-time active learning
- **Applications**: Digital health, Electric vehicle reliability, and Smart manufacturing.

EDUCATION

University of Michigan, Ann Arbor, MI, USA
Ph.D., Industrial & Operations Engineering *Sep. 2018 – Apr. 2023*

University of Michigan, Ann Arbor, MI, USA
M.S., Statistics *Sep. 2021 – Apr. 2023*

Korea University, Seoul, South Korea
M.S., Industrial Management Engineering *Mar. 2016 – Aug. 2018*

Korea University, Seoul, South Korea
B.S., Industrial Management Engineering *Mar. 2010 – Feb. 2016*

PUBLICATIONS

JOURNAL PAPERS

1. **Chung, S.** and Kontar, R. (2024) "Federated Multi-output Gaussian Processes," *Technometrics*, 66(1), 90-103.
   - ***Quality, Statistics, and Reliability (QSR) Best Paper finalist***, 2022 INFORMS Annual Meeting
2. **Chung, S.** and Kontar, R. (2023+) "Federated Condition Monitoring Signal Prediction with Improved Generalization," *IEEE Transactions on Reliability* (forthcoming).
3. **Chung, S.**, Kontar, R., and Wu, Z. (2022) "Weakly-supervised Multi-output Regression via Correlated Gaussian Processes," *INFORMS Journal on Data Science*, 1(2), 115-137.
   - ***Quality Control & Reliability Engineering (QCRE) Best Student Paper finalist***, 2021 IISE Annual Conference
4. **Chung, S.**, Chou, C.-H., Fang, X., Kontar, R., and Okwudire, C. (2022) "A Multi-stage Approach for Knowledge-guided Predictions with Application to Additive Manufacturing," *IEEE Transactions on Automation Science and Engineering*, 19(3), 1675-1687.

5. Kontar, R., Shi, N., Yue, X., **Chung, S.**, Byon, E., Chowdhury, M., Jin, J., Kontar, W., Masoud, N., Noueihed, M., Okwudire, C. E., Raskutti, G., Saigal, R., Singh, K., and Ye, Z. (2021) "The Internet of Federated Things (IoFT)", *IEEE Access*, 9, 156071.

6. Wang, J., **Chung, S.**, AlShelahi, A., Kontar, R., Byon, E., and Saigal, R. (2021) "Look-ahead Decision Making for Renewable Energy: A Dynamic "Predict and Store" Approach", *Applied Energy*, 296, 117068.

7. **Chung, S.** and Kontar, R. (2021) "Functional Principal Component Analysis for Extrapolating Multi-stream Longitudinal Data," *IEEE Transactions on Reliability*, 70(4), 1321.

8. **Chung, S.**, Park, Y.-W., and Cheong, T. (2020) "A Mathematical Programming Approach for Integrated Multiple Linear Regression Subset Selection and Validation," *Pattern Recognition*, 108, 107565.

9. Lee, S., Kim, Y., Kahng, H., Lee, S.-K., **Chung, S.**, Cheong, T., Shin, K., Park, J., and Kim, S. B.* (2020). "Intelligent Traffic Control for Autonomous Vehicle Systems based on Machine Learning," *Expert Systems with Applications*, Vol. 144, 113074.

10. Lee, H., **Chung, S.**, Cheong, T., and Song, S. H. (2018) "Accounting for Fairness in a Two-stage Stochastic Programming Model for Kidney Exchange Programs," *International Journal of Environmental Research and Public Health*, 15(7), 1491.

11. Yea, M., **Chung, S.**, Cheong, T., and Kim, D. (2018) "Sharing of Benefits from a Logistics Alliance Based on a Hub-Spoke Network: a Cooperative Game Theoretic Approach," *Sustainability*, 10(6), 1855.

12. Yuh, J., **Chung, S.**, and Cheong, T. (2017) "Reformulation-linearization Technique Approach for Kidney Exchange Program IT Healthcare Platforms," *Applied Sciences*, 7(8), 847.

Working Papers (∗: corresponding author, †: student advised by me)

1. **Chung, S.** and Kontar, R. "Real-time Adaptation for Online Condition Monitoring Signals using Label-aware Neural Processes." (submitted, Arxiv [Link])
   - ***Quality Control & Reliability Engineering (QCRE) Best Track Paper finalist***, 2024 IISE Annual Conference

2. Gao, J†. and **Chung, S***. "Federated Transfer Learning via Multi-output Gaussian Processes with Spike-and-slab Prior"

3. **Chung, S.** and Cha, H.*, and Cheong, T.* "A Two-stage Metaheuristic Algorithm for Parallel Machine Scheduling with Additional Resource Inputs: with Application to Ship Manufacturing"

Teaching Experience

Instructor (at University of Virginia)

- SYS 4582: Selected Topics in Systems Engineering - Data Mining (Spring 2024)
- SYS 6021: Statistical Modeling I (Fall 2023)

Teaching Assistant (at University of Michigan)

- IOE/STATS 570: Experimental Design (Winter 2022)

- IOE 265: Probability & Statistics for Engineers (Winter 2020, 2021)

Teaching Certificates

- Completion of Rackham-CRLT Preparing Future Faculty (PFF) seminar, 2022
  - Five-week intensive training program on inclusive teaching and learning for undergraduate and graduate level courses

Awards, Honors, & Scholarships

Awards

- QCRE Best Track Paper Finalist (Winner TBD), 2024 IISE Annual Conference "Real-time Adaptation for Condition Monitoring Signal Prediction using Label-aware Neural Processes"
- QSR Best Paper Competition Finalist, 2022 INFORMS Annual Meeting, "Federated Multi-output Gaussian Processes"
- QCRE Best Student Paper Award Finalist, 2021 IISE Annual Conference, "Weakly-supervised Multi-output Regression via Correlated Gaussian Processes"
- IEEE Access Featured Article, "The Internet of Federated Things (IoFT)"

Scholarships

- Rackham Predoctoral Fellowship (one of the most prestigious awards granted by Rackham Graduate School, 2022 – 2023 [Link])
- IOE Department Fellowship, University of Michigan (full tuition and stipend, 2018 – 2019)
- National Scholarship for Science and Engineering, Korea Student Aid Foundation (merit-based scholarship for full tuition, 2010 – 2015)

Grants

Funded Research Projects & Professional Activities

- Achieving the Future of Worker Injury Risk Assessment: Personalized and Privacy-Preserving
  - Sponsor: 4-VA
  - Amount: $31,000
  - Date: May. 2024 – Jun. 2025
  - Role: PI
  - with Dr. Sol Lim (Co-PI) and Dr. Maury Nussbaum (Co-PI)
- Diversity, Equity, and Inclusion Student Grant
  - Sponsor: College of Engineering at University of Michigan
  - Amount: $1,480
  - Date: Mar. 2020 – Dec. 2020
  - with INFORMS Student Chapter at UM

Presentations & Talks

Invited Talks

1. Probabilistic Predictive Analytics for Collaborative Systems
   - UVa AIML Seminar, University of Virginia, Oct. 2023
   - Department of Industrial and Systems Engineering, North Carolina A&T State University, Sep. 2023

2. Collaborative Data Analytics for Smart and Connected Systems
    - Department of Industrial and Systems Engineering, University of Missouri, Dec. 2022
    - Department of Industrial Engineering, University of Pittsburgh, Jan. 2023
    - Department of Industrial and Systems Engineering, Auburn University, Jan. 2023
    - Department of Industrial Engineering, Clemson University, Jan. 2023
    - Department of Industrial and Manufacturing Engineering, Florida State-Florida A&M University, Feb. 2023
    - Department of Engineering Systems and Environment, University of Virginia, Feb. 2023
    - School of Systems and Enterprises, Stevens Institute of Technology, Feb. 2023
    - Department of Industrial Engineering, University of Arkansas, Feb. 2023

CONFERENCE PRESENTATIONS

1. Fast Personalization for Heterogeneous Condition Monitoring Signals Using Neural Processes
    - INFORMS 2023 Annual Meeting, Phoenix, AZ, Oct. 15 – 18
2. Federated Multi-output Gaussian Processes
    - QSR Best Paper Competition, INFORMS 2022 Annual Meeting, Indianapolis, IN, Oct. 16 – 19
3. Federated Condition Monitoring Signal Prediction with Improved Generalization
    - INFORMS 2021 Annual Meeting, Anaheim, CA, Oct. 24 – 27
4. Weakly-supervised Multi-output Regression via Correlated Gaussian Processes
    - QCRE Best Student Paper Competition, IISE 2021
    - INFORMS 2020 Annual Meeting
    - The 2020 Michigan Student Symposium for Interdisciplinary Statistical Sciences (MSSISS), Ann Arbor, MI, Feb. 28 (poster)
5. Functional Principal Component Analysis for Extrapolating Multi-stream Longitudinal Data
    - INFORMS 2019 Annual Meeting, Seattle, WA, Oct. 20 – 23
    - The 2019 Michigan Student Symposium for Interdisciplinary Statistical Sciences (MSSISS), Ann Arbor, MI, Mar. 28
6. Mathematical Programming for Regression Subset Selection with Diagnostic Constraints
    - INFORMS 2017 Annual Meeting, Huston, TX, Oct. 22 – 25.
7. Reformulation-linearization Technique Application on Integer Programming Models for Organ Exchange Program
    - INFORMS 2016 Annual Meeting, Nashville, TN, Nov. 13 – 16.

SERVICE, VOLUNTEERING & ACTIVITIES

ACADEMIC SERVICE

- Reviewer for *IISE Transactions, IEEE Transactions on Reliability, IEEE Transactions on Automation Science and Engineering, IEEE/ASME Transactions on Mechatronics, Journal of Intelligent Manufacturing, and AISTATS 2022, 2023*
- Session chair at *INFORMS Annual Meeting 2022, 2023*

- Student Representative, The 2021 Michigan Student Symposium for Interdisciplinary Statistical Sciences (MSSISS 2021)

Society Leadership

- Chapter President, Central Virginia Chapter at Korean-American Scientists and Engineers Association (KSEA) (2023 –)
- Chair, Social Division of INFORMS at UM (2020)
- President, Korea University Alumni Association at UM (2021 – 2022)

Outreach

- Society of Women Engineers at UVA
  - Volunteering at high school visit weeks to introduce Systems Engineering and ongoing research.
- Science Communication Fellows at UM Museum of Natural History (2022)
  - Developing inquiry-based activities that showcase and share my research with K-12 students and/or the public at community outreach events

Modified on Mar. 2024