[CURRICULUM VITAE]

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EDUCATION

Mar 2011 ~ Aug 2015	Ph.D., Industrial Engineering, Seoul National University, Seoul, Korea
Mar 2008 ~ Feb 2011	B.S., Industrial Engineering (1st Rank in Dept.), Seoul National University, Seoul, Korea

EXPERIENCE

Sep 2017 ~ present	Assistant Professor, Department of Systems Management Engineering (Industrial Engineering), Sungkyunkwan University, Suwon, Korea
Jan 2018 ~ Dec 2018	Visiting Scholar, Courant Institute of Mathematical Sciences & Center for Data Science, New York University, New York, NY, USA
Sep 2015 ~ Aug 2017	Research Staff Member, Samsung Advanced Institute of Technology, Suwon, Korea

PROFESSIONAL ACTIVITIES

Jan 2021 ~ present	Board Member, Korean Institute of Industrial Engineers
Jan 2018 ~ present	Board Member, Korea Data Mining Society
Jan 2020 ~ Dec 2021	Board Member, Korean Operations Research and Management Science Society

HONORS AND AWARDS

2021	Best Paper Award (with Jaeho Kim), Korean Institute of Information Scientists and Engineers
2021	Best Paper Award (with Jongmin Han), Korean Institute of Information Scientists and Engineers
2021	Best Paper Award (with Myeonginn Kang), Korean Institute of Information Scientists and Engineers
2020	Teaching Award (神品), Sungkyunkwan University
2020	Research Award (神品), Sungkyunkwan University
2020	BK21 PLUS Outstanding Researcher Award, Ministry of Education
2020	Best Paper Award (with Hyungu Kang), Korean Institute of Information Scientists and Engineers
2020	Best Paper Award (with Jongmin Han), Korean Institute of Information Scientists and Engineers

2020	Best Paper Award (with Kyoham Shin & Jongmin Han), Korean Institute of Information Scientists and Engineers
2019	Teaching Award (神品), Sungkyunkwan University
2019	SAS Best Paper Award (with Myeonginn Kang), SAS Korea
2019	SAS Best Paper Award (with Kyoham Shin), SAS Korea
2018	Research Award (神品), Sungkyunkwan University
2016	Gold Prize (Base Technology), Samsung Best Paper Award, Samsung
2015	The 7th Lee Joong Han Award (Research), Department of Industrial Engineering, Seoul National University
2013	SAS Best Paper Award, SAS Korea
2011	Best Tutor Award, College of Engineering, Seoul National University
2011	Best Graduate Award, SNU College of Engineering Alumni Association
2011	Summa Cum Laude, Seoul National University
2008 ~ 2011	National Scholarship for Science and Engineering, Korea Student Aid Foundation

RESEARCH INTERESTS

- **Algorithms/Methodologies**
  - Cost-effective machine learning
  - Active data acquisition and exploration
  - Uncertainty-aware machine learning
  - Multimodal machine learning
  - Interpretable/Explainable machine learning
- **Industrial AI Applications**
  - Fault detection and process control for manufacturing systems
  - Materials property prediction and inverse design
  - Approximation of metrological and analytical instruments

PUBLICATIONS

- **International Journals** (†equal contribution, *corresponding author)

1. Jaewoong Shim, Seokho Kang, Sungzoon Cho* (2021+), **"Active inspection for cost-effective fault prediction in manufacturing process"**, *Journal of Process Control*, R&R.
2. Seokho Kang* (2021+), **"Using binary classifiers for one-class classification"**, *Expert Systems with Applications*, R&R.
3. Youngchun Kwon†, Seokho Kang†, Youn-Suk Choi*, Inkoo Kim (2021+), **"Evolutionary design of molecules based on deep learning and genetic algorithm"**, Scientific Reports, R&R.
4. Jaewoong Shim, Seokho Kang, Sungzoon Cho* (2021), **"Active cluster annotation for wafer map pattern classification in semiconductor manufacturing"**, *Expert Systems with Applications* 183: 115429.
5. Kyoham Shin, Jongmin Han, Seokho Kang* (2021), **"MI-MOTE: Multiple imputation-based minority oversampling technique for imbalanced and incomplete data classification"**, *Information Sciences* 575: 80-89.
6. Hyungu Kang, Seokho Kang* (2021), **"A stacking ensemble classifier with handcrafted and convolutional features for wafer map pattern classification"**, *Computers in Industry* 129: 103450.
7. Myeonginn Kang, Seokho Kang* (2021), **"Data-free knowledge distillation in neural networks for regression"**, *Expert Systems with Applications* 175: 114813.
8. Jongmin Han, Seokho Kang* (2021), **"Active learning with missing values considering imputation**

uncertainty", *Knowledge-Based Systems* 224: 107079.

9. Seokho Kang* (2021), **"Product failure prediction with missing data using graph neural networks"**, *Neural Computing & Applications* 33: 7225-7234.
10. Seokho Kang* (2021), **"*k*-nearest neighbor learning with graph neural networks"**, *Mathematics* 9(8): 830.
11. Hwehee Chung†, Jongho Park†, Jongsoo Keum†, Hongdo Ki*, Seokho Kang* (2020), "**Unsupervised anomaly detection using style distillation**", *IEEE Access* 8: 221494-221502.
12. Youngchun Kwon, Dongseon Lee, Youn-Suk Choi*, Kyoham Shin, Seokho Kang* (2020), **"Compressed graph representation for scalable molecular graph generation"**, *Journal of Cheminformatics* 12:58.
13. Seokho Kang* (2020), **"Rotation-invariant wafer map pattern classification with convolutional neural networks"**, *IEEE Access* 8: 170650-170658.
14. Seokho Kang, Youngchun Kwon, Dongseon Lee, Youn-Suk Choi* (2020), **"Predictive modeling of NMR chemical shifts without using atomic-level annotations"**, *Journal of Chemical Information and Modeling* 60(8): 3765-3769.
15. Jaewoong Shim, Seokho Kang, Sungzoon Cho* (2020), **"Active learning of convolutional neural network for cost-effective wafer map pattern classification"**, *IEEE Transactions on Semiconductor Manufacturing* 33(2): 258-266.
16. Seokho Kang* (2020), **"Model validation failure in class imbalance problems"**, *Expert Systems with Applications* 146: 113190.
17. Youngchun Kwon, Dongseon Lee, Youn-Suk Choi, Myeonginn Kang, Seokho Kang* (2020), **"Neural message passing for NMR chemical shift prediction"**, *Journal of Chemical Information and Modeling* 60(4): 2024-2030.
18. Seokho Kang* (2020), **"Joint modeling of classification and regression for improving faulty wafer detection in semiconductor manufacturing"**, *Journal of Intelligent Manufacturing* 31(2): 319-326.
19. Dongil Kim, Seokho Kang*, Sungzoon Cho (2020), **"Expected margin-based pattern selection for support vector machines"**, *Expert Systems with Applications* 139: 112865.
20. Elman Mansimov, Omar Mahmood, Seokho Kang, Kyunghyun Cho* (2019), **"Molecular geometry prediction using a deep generative graph neural network"**, *Scientific Reports* 9: 20381.
21. Youngchun Kwon, Jiho Yoo, Youn-Suk Choi, Won-Joon Son, Dongseon Lee, Seokho Kang* (2019), "**Efficient learning of non-autoregressive graph variational autoencoders for molecular graph generation**", *Journal of Cheminformatics* 11: 70.
22. Seokho Kang*, Daewoong An, Jaeyoung Rim (2019), **"Incorporating virtual metrology into failure prediction"**, *IEEE Transactions on Semiconductor Manufacturing* 32(4): 553-558.
23. Dongil Kim, Seokho Kang* (2019), **"Effect of irrelevant variables on faulty wafer detection in semiconductor manufacturing"**, *Energies* 12(13): 2530.
24. Seokho Kang, Dongil Kim*, Sungzoon Cho (2019), **"Approximate training of one-class support vector machines using expected margin"**, *Computers & Industrial Engineering* 130: 772-778.
25. Dongil Kim, Jeongin Koo, Hyein Kim, Seokho Kang*, Sang Hyun Lee, Jeong Tae Kang (2019), "**Rapid fault cause identification in surface mount technology processes based on factory-wide data analysis**", *International Journal of Distributed Sensor Networks* 15(2):1550147719832802.
26. Seokho Kang*, Kyunghyun Cho (2019), **"Conditional molecular design with deep generative models"**, *Journal of Chemical Information and Modeling* 59(1): 43-52.
27. Jaehong Yu, Seokho Kang* (2019), **"Clustering-based proxy measure for optimizing one-class classifiers"**, *Pattern Recognition Letters* 117: 37-44.
28. Youngdoo Son, Seokho Kang* (2018), **"Regression with re-labeling for noisy data"**, *Expert Systems with Applications* 114: 578-587.
29. Kyungdoc Kim†, Seokho Kang†, Jiho Yoo, Youngchun Kwon, Youngmin Nam, Dongseon Lee, Inkoo Kim, Youn-Suk Choi*, Yongsik Jung, Sangmo Kim, Won-Joon Son, Jhunmo Son, Hyo Sug Lee*, Sunghan Kim*, Jaikwang Shin, Sungwoo Hwang (2018), **"Deep learning-based inverse design model for intelligent discovery of organic molecules"**, *npj Computational Materials* 4: 67.

30. Seokho Kang, Eunji Kim, Jaewoong Shim, Wonsang Chang, Sungzoon Cho* (2018), "**Product failure prediction with missing data**", *International Journal of Production Research*, 56(14): 4849-4859.
31. Seokho Kang* (2018), "**Personalized prediction of drug efficacy for diabetes treatment via patient-level sequential modeling with neural networks**", *Artificial Intelligence in Medicine* 85: 1-6.
32. Seokho Kang, Pilsung Kang* (2018), "**Locally linear ensemble for regression**", *Information Sciences* 432: 199-209.
33. Seokho Kang* (2018), "**On effectiveness of transfer learning approach for neural network-based virtual metrology modeling**", *IEEE Transactions on Semiconductor Manufacturing* 31(1): 149-155.
34. Jiwon Yang, Seung-kyung Lee, Seokho Kang, Sungzoon Cho*, Young-Hak Lee, Hae-Sang Park (2017), "**Ranking process parameter association with low yield wafers using spec-out event network analysis**", *Computers & Industrial Engineering* 113: 419-424.
35. Seokho Kang, Sungzoon Cho*, Su-jin Rhee, Kyung-Sang Yu (2017), "**Reliable prediction of anti-diabetic drug failure using a reject option**", *Pattern Analysis and Applications* 20(3): 883-891.
36. Misuk Kim, Seokho Kang, Jehyuk Lee, Hyunchang Cho, Sungzoon Cho*, Jee Su Park (2017), "**Virtual metrology for copper-clad laminate manufacturing**", *Computers & Industrial Engineering* 109: 280-287.
37. Seokho Kang, Pilsung Kang* (2017), "**An intelligent virtual metrology system based on adaptive update for semiconductor manufacturing**", *Journal of Process Control* 52: 66-74.
38. Seokho Kang, Eunji Kim, Jaewoong Shim, Sungzoon Cho*, Wonsang Chang, Junhwan Kim (2017), "**Mining the relationship between production and customer service data for failure analysis of industrial products**", *Computers & Industrial Engineering* 106: 137-146.
39. Seokho Kang, Dongil Kim*, Sungzoon Cho (2016), "**Efficient feature selection based on random forward search for virtual metrology modeling**", *IEEE Transactions on Semiconductor Manufacturing* 29(4): 391-398.
40. Jooseoung Park, Sungzoon Cho*, Seung-kyung Lee, Seokho Kang, Young Soo Kim, Ji Young Kim, Dong Seuk Choi (2015), "**Energy-saving decision making framework for HVAC with usage logs**", *Energy and Buildings* 108: 346-357.
41. Seokho Kang, Sungzoon Cho* (2015), "**Optimal construction of one-against-one classifier based on meta-learning**", *Neurocomputing* 167: 459-466.
42. Seokho Kang, Sungzoon Cho*, Daewoong An, Jaeyoung Rim (2015), "**Using wafer map features to better predict die-level failures in final test**", *IEEE Transactions on Semiconductor Manufacturing* 28(3): 431-437.
43. Seokho Kang, Sungzoon Cho, Pilsung Kang* (2015), "**Multi-class classification via heterogeneous ensemble of one-class classifiers**", *Engineering Applications of Artificial Intelligence* 43: 35-43.
44. Seokho Kang, Sungzoon Cho* (2015), "**A novel multi-class classification algorithm based on one-class support vector machine**", *Intelligent Data Analysis* 19(4): 713-725.
45. Seokho Kang, Pilsung Kang, Taehoon Ko, Sungzoon Cho*, Su-jin Rhee, Kyung-Sang Yu (2015), "**An efficient and effective ensemble of support vector machines for anti-diabetic drug failure prediction**", *Expert Systems with Applications* 42(9): 4265-4273.
46. Yongwon Park, Seokho Kang, Sungzoon Cho* (2015), "**Memory die clustering and matching for optimal voltage window in semiconductor**", *IEEE Transactions on Semiconductor Manufacturing* 28(2): 180-187.
47. Dongil Kim*, Pilsung Kang, Seung-kyung Lee, Seokho Kang, Seungyong Doh, Sungzoon Cho (2015), "**Improvement of virtual metrology performance by removing metrology noises in a training dataset**", *Pattern Analysis and Applications* 18(1): 173-189.
48. Seokho Kang, Sungzoon Cho, Pilsung Kang* (2015), "**Constructing a multi-class classifier using one-against-one approach with different binary classifiers**", *Neurocomputing* 149: 677-682.
49. Seokho Kang, Sungzoon Cho* (2014), "**Approximating support vector machine with artificial neural network for fast prediction**", *Expert Systems with Applications* 41(10): 4989-4995.
50. Seung-kyung Lee, Bongseok Kim, Minhoe Hur, Jooseoung Park, Seokho Kang, Sungzoon Cho*, Dongha Lee, Daehyung Lee (2014), "**Knowledge discovery in inspection reports of marine structures**", *Expert Systems with Applications* 41(4): 1153-1167.

51. Soojin Kim, Keunyoung Seo*, Seokho Kang, Sungzoon Cho (2013), "**Organizational tenure diversity as predictors of combat performance in ROK army**", *Military Psychology* 25(4): 345-353.

- **International Conferences, Domestic Journals/Conferences, and Patents**

  - Full publication list available at http://sites.google.com/view/skkudm

PROJECTS

May 2021 ~ Oct 2021	**Development of Algorithm for Manufacturing Process Data Analysis**, Samsung Electronics. (PI)
May 2021 ~ Jul 2021	**Development of Algorithm for TV Usage Pattern Analysis**, Samsung Electronics. (PI)
May 2021 ~ Apr 2022	**Next Generation Machine Learning Technology for Autonomous Materials Synthesis and Analysis**, Samsung Advanced Institute of Technology. (PI)
Mar 2020 ~ Feb 2022	**Shinsung-SKKU Research Center for Industrial AI Solution**, Shinsung E&G.
Mar 2020 ~ Feb 2023	**Graph-Structured Data Modeling Towards Advanced Manufacturing Intelligence** (Grant No. NRF-2020R1C1C1003232), National Research Foundation of Korea. (PI)
Dec 2019 ~ Dec 2020	**Next Generation Machine Learning Technology for Autonomous Materials Development and Analysis**, Samsung Advanced Institute of Technology. (PI)
Sep 2019 ~ Feb 2022	**Explainable, Predictable & Optimizable AI for Smart Manufacturing Platform** (Grant No. NRF-2019R1A4A1024732), National Research Foundation of Korea.
Nov 2018 ~ Oct 2019	**Next Generation Technology for Materials Inverse Design**, Samsung Advanced Institute of Technology. (PI)
Dec 2017 ~ Mar 2018	**Self-Adaptive Energy Conversion Materials**, National Research Foundation of Korea.
Sep 2017 ~ Aug 2020	**Development of Intelligent Metrology System for Manufacturing Process Considering Dynamic Multi-Source Data Environment** (Grant No. NRF-2017R1C1B5075685), National Research Foundation of Korea. (PI)
Apr 2015 ~ Aug 2015	**Data Mining Process for Quality Management of Home Appliances**, Samsung Electronics Co., Ltd. (RA @SNU)
May 2014 ~ Nov 2013	**Big Data Analysis for Semiconductor Quality Prediction**, SK Hynix Inc. (RA @SNU)
Feb 2014 ~ Aug 2015	**Knowledge Discovery from Socio-Technical Data**, Data Science for Knowledge Creation Research Center, National Research Foundation of Korea. (RA @SNU)
Jan 2014 ~ Dec 2013	**Development of ICT Strategy for Doosan Electronics**, Doosan Corp. (RA @SNU)
Apr 2013 ~ Nov 2013	**Advanced Contents Retrieval for Smart TV**, LG Electronics Inc. (RA @SNU)
Oct 2012 ~ Mar 2013	**Intelligent Process Control for Semiconductor Manufacturing**, Samsung Electronics Co., Ltd. (RA @SNU)
Dec 2011 ~ Sep 2012	**Usage Pattern Analysis and Failure Prediction for Air-Conditioning Systems**, Samsung Electronics Co., Ltd. (RA @SNU)

References available upon request

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