

# JEONGSUB CHOI

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## RESEARCH INTERESTS

Machine learning, data mining, data analytics and managerial informatics, system analysis

## APPOINTMENT

- 09/2020–Present    **Assistant Professor**  
Management Information Systems, West Virginia University, Morgantown, WV
- 09/2017–05/2020    **Part-Time Lecturer**  
Management Science and Information Systems, Rutgers University, New Brunswick, NJ
- 08/2013–05/2020    **Graduate Research Assistant**  
Industrial and Systems Engineering, Rutgers University, New Brunswick, NJ
- 08/2017–12/2017    **Graduate Teaching Assistant**  
Industrial and Systems Engineering, Rutgers University, New Brunswick, NJ
- 08/2014–12/2015    **Graduate Teaching Assistant**  
Industrial and Systems Engineering, Rutgers University, New Brunswick, NJ

## EDUCATION

- 10/2020    **Ph.D. in Industrial and Systems Engineering**  
Rutgers University, New Brunswick, NJ  
- Dissertation: Sparse machine learning methods and its application to semiconductor manufacturing processes (advisor: Prof. Myong K. Jeong)
- 05/2018    **M.S. in Statistics**  
Rutgers University, New Brunswick, NJ
- 05/2014    **M.S. in Industrial and Systems Engineering**  
Rutgers University, New Brunswick, NJ
- 02/2011    **B.S. in Industrial and Information Systems Engineering**  
Soongsil University, Seoul, Republic of Korea

## PUBLICATION

### **Refereed/Accepted Papers**

17. **J. Choi**, Y. Son, and J. Kang. (2024). Group-exclusive feature group lasso and applications to automatic sensor selection for virtual metrology in semiconductor manufacturing. *IEEE Transactions on Semiconductor Manufacturing*. 1-1. <https://doi.org/10.1109/TSM.2024.3444720>
16. **J. Choi**, M. Zhu, J. Kang, and M. K. Jeong. (2024). Convolutional neural network based multi-input multi-output model for multi-sensor multivariate virtual metrology in semiconductor manufacturing. *Annals of*

- Operations Research*, 339, 185-201. <https://doi.org/10.1007/s10479-024-05902-z>
15. **J. Choi**, Y. Son, and M. K. Jeong. (2024). Gaussian kernel with correlated variables for incomplete data. *Annals of Operations Research*, 341, 223-244. <https://doi.org/10.1007/s10479-023-05656-0>
  14. **J. Choi**, B. Kim, and H. S. Lee. (2023). Competitor identification with memory in a dynamic financial transaction network. *Annals of Operations Research*, 341, 349-374. <https://doi.org/10.1007/s10479-023-05552-7>
  13. S. Lee, **J. Choi**, and Y. Son. (2022). Efficient visibility algorithm for high-frequency time-series: application to fault diagnosis with graph convolutional network. *Annals of Operations Research*, 339, 813-833. <https://doi.org/10.1007/s10479-022-05071-x>
  12. M. Choi, S.-H. Yoo, J. Lee, **J. Choi**, and B. Kim. (2022). A modified gamma/Gompertz/NBD model for estimating technology lifetime. *Scientometrics*, 127(10), 5731-5751. <https://doi.org/10.1007/s11192-022-04489-1>
  11. **J. Choi**, Y. Son, and M. K. Jeong. (2022). Restricted relevance vector machine for missing data with application to virtual metrology. *IEEE Transactions on Automation Science and Engineering*, 19(4), 3172-3183. <https://doi.org/10.1109/TASE.2021.3111096>
  10. **J. Choi**, A. Tosyali, B. Kim, H. Lee, and M. K. Jeong. (2022). A novel method for identifying competitors using a financial transaction network. *IEEE Transactions on Engineering Management*, 69(4), 845-860. <https://doi.org/10.1109/TEM.2019.2931660>
  9. B. Tavakkol, **J. Choi**, M. K. Jeong, and S. L. Albin. (2022). Object-based cluster validation with densities. *Pattern Recognition*, 121, 108223. <https://doi.org/10.1016/j.patcog.2021.108223>
  8. **J. Choi**, B. Kim, C. H. Han, H. Hahn, H. Park, J. You, and M. K. Jeong. (2021). Methodology for assessing the contribution of knowledge services during the new product development process to business performance. *Expert Systems with Applications*, 167, 113860. <https://doi.org/10.1016/j.eswa.2020.113860>
  7. A. Tosyali, **J. Choi**, B. Kim, H. Lee, and M. K. Jeong. (2021). A dynamic graph-based approach to ranking firms for the identification of key players using inter-transactions. *Annals of Operations Research*, 303, 5-27. <https://doi.org/10.1007/s10479-021-04100-5>
  6. A. Tosyali, J. Kim, **J. Choi**, Y. Kang, and M. K. Jeong. (2020). New node anomaly detection algorithm based on nonnegative matrix factorization for directed citation network. *Annals of Operations Research*, 288, 457-474. <https://doi.org/10.1007/s10479-019-03508-4>
  5. **J. Choi** and M. K. Jeong. (2019). Deep autoencoder with clipping fusion regularization on multi-step process signals for virtual metrology. *IEEE Sensors Letters*, 3(1), 1-4. <https://doi.org/10.1109/LSSENS.2018.2884735>
  4. A. Tosyali, J. Kim, **J. Choi**, and M. K. Jeong. (2019). Regularized asymmetric nonnegative matrix factorization for clustering in directed networks. *Pattern Recognition Letters*, 125, 750-757. <https://doi.org/10.1016/j.patrec.2019.07.005>
  3. G. Gazzola, **J. Choi**, D. S. Kwak, B. K. Kim, D. M. Kim, S. H. Tong, and M. K. Jeong. (2018). Integrated variable importance assessment in multi-stage manufacturing processes. *IEEE Transactions on Semiconductor Manufacturing*, 31(3), 343-355. <https://doi.org/10.1109/TSM.2018.2853586>
  2. **J. Choi**, B. Kim, H. Hahn, H. Park, Y. Jeong, J. You, and M. K. Jeong. (2017). Data mining-based variable assessment methodology for evaluating the contribution of knowledge services of a public research institute to business performance of Firms. *Expert Systems with Applications*, 84, 37-48. <https://doi.org/10.1016/j.eswa.2017.04.057>
  1. A. Rodriguez, A. Tosyali, B. Kim, **J. Choi**, B. Coh, J. Lee, and M. K. Jeong. (2016). Patent clustering and outlier ranking methodologies for attributed patent citation networks. *IEEE Transactions on Engineering Management*, 63(4), 426-437. <https://doi.org/10.1109/TEM.2016.2580619>

## PRESENTATION

19. **J. Choi.** Neural Networks with regularization for automatic sensor selection in semiconductor manufacturing. *Industrial Artificial Intelligence Conference*, Jan. 30, 2024. Hanyang University ERICA, Seoul, South Korea.
18. **J. Choi.** Managerial Informatics and Modeling in Complex System. *MIS Department Research Presentation*, West Virginia University, Nov. 9, 2023. Morgantown, WV.
17. **J. Choi** and B. Kim. Competitor Identification in Interfirm Transaction Networks. In *2023 INFORMS Annual Meeting*, Oct. 15-18, 2023. Phoenix, AZ.
16. B. Kim and **J. Choi.** A new customer recommendation method for identifying potential entrants in a B2B transaction network. In *2023 INFORMS Annual Meeting*, Oct. 15-18, 2023. Phoenix, AZ.
15. **J. Choi**, M. Zhu, J. Kang, and M. K. Jeong. Multi-Sensor Multivariate Virtual Metrology Using Convolutional Neural Networks in Semiconductor Manufacturing. In *2022 INFORMS Annual Meeting*, Oct. 16-19, 2022. Indianapolis, IN.
14. **J. Choi**, Y. Son, and M. K. Jeong. Restricted Relevance Vector Machine for Missing Data and Application to Virtual Metrology. In *2022 IEEE 18th International Conference on Automation Science and Engineering (CASE)*, Aug. 20-24, 2022. Mexico City, Mexico and Chengdu, China.
13. **J. Choi**, Y. Son, and J. Kang. Deep Learning for Virtual Metrology with Automatic Sensor Selection at Semiconductor Manufacturing Process. In *2021 INFORMS Annual Meeting*, Oct. 24-27, 2021. Anaheim, CA.
12. R. Wang, **J. Choi**, and M. Zhu. Deep Learning-Based Review Prediction for Smart Health Monitoring Wearable Device. In *2021 INFORMS Annual Meeting*, Oct. 24-27, 2021. Anaheim, CA.
11. **J. Choi.** Handling Missing Values in Relevance Vector Machines. *Dongguk Data Science Seminar (D2S2)*, Data Science Laboratory, Dongguk University, Jan. 6, 2021. Seoul, South Korea.
10. **J. Choi**, Y. Son, and M. K. Jeong. Virtual Metrology Using Restricted Relevance Vector Machine for Incomplete Data. In *2020 Virtual INFORMS Annual Meeting*, Nov. 08-11, 2020. Online.
9. **J. Choi**, J. Kang, and M. K. Jeong. Deep Learning Based Feature Extraction with Fusion Regularization on Sensor Signals of Semiconductor Manufacturing Process. In *2019 INFORMS Annual Meeting*, Oct. 22-25, 2019, Seattle, WA.
8. **J. Choi**, H. Bokadia, and M. K. Jeong. Deep Autoencoder with Regularization on Sensor Signals for Virtual Metrology in Semiconductor Manufacturing. In *2018 INFORMS Annual Meeting*, Nov. 4-7, 2018, Phoenix, AZ.
7. Y. Son, **J. Choi**, J. Lee, M. K. Jeong. Sparse Bayesian Regression Analysis for Handling Missing Values of Incomplete Data. In *2017 Korea Business Intelligence Data Mining Society Conference*, Nov. 24-25, 2017, Busan, South Korea.
6. M. K. Jeong, A. Tosyali, **J. Choi**, B. Kim, and H. Lee. New Data Mining Models to Analyze Big Value Chain Networks Data. In *US-Korea Conference 2017*, Aug. 9-12, 2017, Washington, D.C.
5. M. K. Jeong, **J. Choi**, Y. Son, and J. Kang. Deep Learning Based Virtual Metrology and Yield Prediction in Semiconductor Manufacturing Processes. In *PHM Asia Pacific 2017*, Jul. 12-16, 2017, Jeju, South Korea.
4. Y.-S. Jeong, B. Kim, M. K. Jeong, **J. Choi**, S. Kwon, and J. Kang. A New Bayesian Classification Model for Uncertain Data. In *2016 INFORMS Annual Meeting*, Nov. 13-16, 2016, Nashville, TN.
3. **J. Choi**, S. Hwang, S. Kwon, J. Kang, and M. K. Jeong. Robust Kernel Based Regression with Applications to a Dynamic Virtual Metrology. In *2016 INFORMS International Meeting*, Jun. 12-15, 2016, Waikola Village, HI.
2. A. Tosyali, B. Kim, **J. Choi**, B. Coh, J. Lee, M. K. Jeong, and A. Rodriguez. Ranking Outliers in Patent Citation Network using Attributes and Graph Structure. In *2015 INFORMS Annual Meeting*, Nov. 1-4, 2015, Philadelphia, PA.
1. G. Gazzola, **J. Choi**, M. K. Jeong, and B. Kim. Integrated Variable Importance Assessment in Multi-Stage Manufacturing Processes. In *2015 INFORMS Annual Meeting*, Nov. 1-4, 2015, Philadelphia, PA.

## TEACHING

- 01/2021–Present     **Primary Instructor**  
John Chambers College of Business and Economics, West Virginia University  
- BCOR-330 *Information Systems/Technology* in Fall 2021, Fall 2022  
- BUDA-450 *Business Data Mining and Visualization* in Fall 2023, Fall 2024  
- BUDA-452 *Business Simulation Modeling* in Spring 2021, Spring 2022, Spring 2023, Spring 2024  
- BUDA-455 *Introduction to Business Intelligence and Artificial Intelligence* in Fall 2023, Spring 2024, Fall 2024  
- BUDA-497A *Special Topic: Business Intelligence and Artificial Intelligence* in Fall 2021
- 09/2017–05/2020     **Primary Instructor**  
Rutgers Business School – New Brunswick, Rutgers University  
- *Operations Management* in Fall 2017, Spring 2018, Spring 2020  
- *Management Information Systems* in Spring 2019  
- *Statistical Methods in Business* in Spring 2018, Fall 2018, Fall 2019
- 10/2017             **Guest Lecturer**  
School of Engineering, Rutgers University  
- *Advanced Topic in IE: Data Mining II* in Fall 2017
- 08/2014–12/2014     **Laboratory Instructor**  
08/2015–12/2015     School of Engineering, Rutgers University  
- *Work Design and Ergonomics Lab* (Dr. James T. Luxhøj) in Fall 2014  
- *Simulation Models in IE* (Dr. Hoang Pham) in Fall 2015
- 08/2017–12/2017     **Teaching Assistant**  
08/2014–12/2015     School of Engineering, Rutgers University  
- *Advanced Topic in IE: Data Mining II* in Fall 2017  
- *Work Design and Ergonomics* in Fall 2017  
- *Engineering Economics* in Fall 2014, Spring 2015, and Fall 2015

## ADVISING/MENTORING

- Undergraduate research mentorship
  - Nathaniel Smith (10/2023 ~ 05/2024)
  - Andrew Taughinbaugh (01/2023 ~ 05/2023) — RAP at WVU
  - Mahlon Reese (07/2022 ~ 12/2022) — EXCEL at WVU
- Graduate research mentorship
  - Nathaniel Smith (05/2024 ~ present)
- Graduate capstone project faculty mentorship
  - Raymond Barley, Mary Major, Luc Tomaswick (Summer 2024) — Capstone project in BUDA-555 for WV High Technology Foundation
  - Dakota Wolfe, Zohaib Khan, Noah Adler (Summer 2024) — Capstone project in BUDA-555 for Nest Health
  - Nathan Thompson, Alex Quinn, Lucas Hilsbos, Todd Lathrop (Summer 2023) — Capstone project in BUDA-555 for Nest Health

## PROFESSIONAL SERVICES AND ACTIVITIES

- Professional Fellows
  - Cloud Analytics Faculty Fellow in the office of the Provost at West Virginia University (06/2024 ~ 05/2025)
- Reviewer/Referee:

*Annals of Operations Research; Engineering Applications with Artificial Intelligence; Expert Systems with Applications; IEEE Transactions on Automation Science and Engineering; IEEE Transactions on Computational Social Systems; IEEE Transactions on Engineering Management; IEEE Transactions on Semiconductor Manufacturing; Pattern Recognitions; Pattern Recognitions Letters*

*IEEE Technology & Engineering Management Society Conference (TEMSCON) 2018, 2019, 2020; IEEE Technology and Engineering Management Society Conference International Symposium on Innovation and Entrepreneurship (TEMS-ISIE) 2018; IEEE International Conference on Technology Management, Operations and Decisions (ICTMOD) 2018, 2020*

- Session Chair:
  - Session (IS/DM), 2024 INFORMS Annual Meeting, with Dr. Tosyali, Ali
  - Session (DM), 2023 INFORMS Annual Meeting
  - Session (DM), 2022 INFORMS Annual Meeting, with Dr. Baek, Jaeseung
  - Special Session (MDS), 2022 IEEE CASE, with Dr. Lee, Chia-Yen
  - Regular Session (MMSC), 2022 IEEE CASE, with Dr. Yue, Xiaowei
  - Session (DM), 2021 INFORMS Annual Meeting, with, with Dr. Kim, Byunghoon
  - Joint session (QSR/DM), 2018 INFORMS Annual Meeting
- Membership:
  - IEEE; INFORMS

#### HONORS AND AWARDS

<u>05/2024</u>	<i>WVU Cloud Analytics Fellowship</i> High Technology Foundation
<u>04/2020</u>	<i>2020 Tayfur Altioik Scholarship</i> Department of Industrial and Systems Engineering, Rutgers University
<u>05/2019</u>	<i>Conference Travel Grants Award</i> School of Graduate Studies, Rutgers University
<u>01/2016–12/2017</u>	<i>Graduate Fellowship</i> Department of Industrial and Systems Engineering, Rutgers University
<u>01/2014–05/2014</u>	<i>Graduate Fellowship</i> Department of Industrial and Systems Engineering, Rutgers University

#### CERTIFICATIONS AND CERTIFICATES

- Certified in Production and Inventory Management (CPIM) - MRP, DSP modules by APICS
- Microsoft Office 2003 Specialist (Access, Excel, PowerPoint, Word) by Microsoft
- Lean Six Sigma Certification-Yellow Belt by CFQ International LLC, Apr. 2013

#### TECHNICAL SKILLS

- **Programming languages:** MATLAB, R, Python, C, Perl
- **Database system:** MS SQL, MS Access
- **Applications:** ARENA, AnyLogic, GAMS, JMP, LINGO, MiniTab, RapidMiner, yEd
- **Miscellaneous:** HTML, Git, Adobe Photoshop, Adobe Illustration