

# Enrico Laoh

Roy and Virginia Dorough Distinguished Graduate Fellow  
School of Industrial Engineering and Management  
Business Analytics and Data Science

Updated Sept 2023

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## Employment

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### Oklahoma State University

Graduate Research and Teaching Assistant, Industrial Engineering and Management 01/2021 – now

- Develop framework and models to analyze healthcare data and synthesize knowledge to support a medical-based decision-making system.
- Do research on collecting, extracting, and building interpretable and explainable Machine Learning models from human physiological data (EEG, ECG, Eye Motion, etc.) to measure their stress level and cognitive state to help industrial AI-based systems generate a robust decision.
- Give a tutorial for the Industrial Engineering and Data analytics-related courses.

### Universitas Indonesia, Depok, Indonesia

Lecturer and Research Associate, Industrial Engineering Department 08/2017 – 01/2021

- Do research on applying descriptive, predictive, and prescriptive analytics for a wide range of industrial problems such as network optimization, power generation, customer segmentation, text summarization, and supply chain design.
- Teach and conduct classes for the Industrial Engineering and Data analytics related courses.

## Education

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**Doctor of Philosophy, Industrial Engineering and Management,** Expected 05/2025

Oklahoma State University, Stillwater, United States

**Graduate Certificate, Business Analytics, and Data Science, (GPA 4.00/4.00)** 08/2023

Oklahoma State University, Stillwater, United States

**Master of Science, Industrial Engineering and Management, (GPA 4.00/4.00)** 12/2022

Oklahoma State University, Stillwater, United States

**Master of Engineering, Data and Quality Engineering, (GPA 4.00/4.00)** 07/2017

Universitas Indonesia, Depok, Indonesia

**Bachelor of Engineering, Industrial Engineering, (GPA 3.88/4.00)** 07/2016

Universitas Indonesia, Depok, Indonesia

## Selected Awards and Honors

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[Alpha Pi Mu Honor Society](#) 2022

School of Industrial Engineering and Management, Oklahoma State University

[Tau Beta Pi Honor Society](#) 2022

College of Engineering, Architecture and Technology, Oklahoma State University

[Phi Kappa Phi Honor Society](#) 2022

Graduate College, Oklahoma State University

[Creativity, Innovation, and Entrepreneurship Scholar](#) 2021

Spears School of Business, Oklahoma State University

Faculty of Engineering, Universitas Indonesia [International Publication Awards](#) 2018 and 2019

*Annual Engineering Dean's Awards for International Publications*

IEEE SMC Society [Merit Paper Awards](#) 2017

*8th International Conference on Awareness Science and Technology (iCAST)*

IEEE Indonesia Section [Best Presenter Award](#) 2017

*3rd International Conference on Science in Information Technology (ICSITech)*

Faculty of Engineering, Universitas Indonesia [Outstanding Engineering Students](#) 2016

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## Research Interest

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My current research interest is to develop explainable artificial intelligence (XAI) frameworks and methodologies to support high-stake decision-making systems. I am especially interested in building interpretable machine learning models, incorporating human capability limitations, and designing human-ai collaborative decision-making systems to improve decision quality and adaptability.

### Methodology

Descriptive modeling, predictive modeling, data analytics, text analytics, statistical learning, multivariate analysis, applied statistics, clustering algorithm, classification algorithm, time series analysis, perturbation method, cognitive analytics, and physiological measurement.

### Applications

Healthcare system, power system, route configuration, supply chain design, time series prediction, customer relationship analytics, sentiment analysis, and trends analytics.

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## Service Activities

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### Service to the Profession

<b>Quality in Research Engineering Symposium</b>	2021
• <i>Reviewer</i>	
<b>The 16th International Conference on Service Systems and Service Management</b>	2019
• <i>Session Chair</i>	
<b>Asia Pacific Conference on Research in Industrial and Systems Engineering</b>	2018, 2019, 2020,2021
• <i>Technical Program Chair</i>	
• <i>Reviewer</i>	

### Service to the University

<b>Vice President of GPSGA Oklahoma State University</b>	2023 - now
• <i>Reporting to the university about chapter performance</i>	
• <i>Maintaining chapter member engagement</i>	
<b>President of INFORMS Oklahoma State University</b>	2022 - now
• <i>Reporting to the university about chapter performance</i>	
• <i>Managing chapter social media</i>	
• <i>Maintaining chapter member engagement</i>	
<b>Graduate and Professional Student Government Association Liaison for IEM Department Oklahoma State University</b>	2022 - 2023
• <i>Represent the IEM Students in the graduate student body</i>	
<b>Statistics Student Consulting Team</b>	2015 - 2017
• <i>Conducting joint research with several industries (Commonwealth Research 2016, 2017)</i>	
• <i>Giving consultation for the undergraduate student thesis project</i>	
<b>Statistics and Quality Engineering Laboratory Universitas Indonesia</b>	
• <i>Chief of Internal Division: managing laboratory internal activities</i>	2016
• <i>Internal Division Staff: preparing internal training and arranging experiment module</i>	2015

### Service to the Community

<b>BTA Group Academy, Jakarta, Indonesia</b>	2014 - 2020
<i>Quantitative and physics tutor</i>	
<b>UI Community Service, Jakarta, Indonesia</b>	2019
<i>Zero paper waste</i>	
<b>UI Community Service, Depok, Indonesia</b>	2018
<i>Science and technology house for UI developing village</i>	

## Collaboration in Grants and Funding

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NEI 1R01EY033861-01 NIH Grants <i>SCH: Harnessing Tensor Information to Improve EHR Data Quality for Accurate Data-driven Screening of Diabetic Retinopathy with Routine Lab Results</i> Amount awarded: \$ 1,194 million	2023
PUTI Research Publication Grants Amount awarded: \$ 7,000	2020, 2022
Community Service Universitas Indonesia Grants Amount awarded: \$ 5,000	2019
PIT 9 Research Publication Grants Amount awarded: \$ 18,000	2019
Community Service Universitas Indonesia Grants Amount awarded: \$ 5,000	2019
PITTA Research Publication and Travel Grants Amount awarded: \$ 6,000	2018
PITTA Research Publication and Travel Grants Amount awarded: \$ 6,000	2017
PITTA Research Publication and Travel Grants Amount awarded: \$ 6,000	2016

## Publications

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### Patents

1. "Permissioned Blockchain System for Halal Supply Chain Through Hyperledger Fabric Web Based Application" (2020) Indonesian Patent (Submitted)
2. "Product Service Systems for CNC (Computer Numerically Controlled) Lathes Machine Maintenance using the ISTAR 2017 Application" (2019) Indonesian Patent No. P00201801971

### Journal Articles

1. Surjandari, I., Dzikri, A., Dhini, A., **Laoh, E.**, Dwi, K., "Stacked Generalization with Sequential Model-Based Optimization for Estimating Used Car Valuation." (2023) *preprint Expert System with Application*. DOI: dx.doi.org/10.2139/ssrn.4388128.
2. Dhini, A., Dwi, K., Surjandari, I., **Laoh, E.**, Dzikri, A., "Prediction of LOS for Heart Disease Patient using Ensemble Machine Learning Approach." (2023) *submitted to Medical & Biological Engineering & Computing Journal*.
3. Surjandari, I., Yusuf, H., **Laoh, E.**, Maulida, R. "Designing a Permissioned Blockchain Network for the Halal Industry Using Hyperledger Fabric with Multiple Channels and the Raft Consensus Mechanism." *Journal of Big Data* (2021). Springer. DOI: 10.1186/s40537-020-00405-7.
4. **Laoh, E.**, Agustriwan, F., Megawati, C., Surjandari, I. "Internet Traffic Forecasting Model using Self Organizing Map and Support Vector Regression Algorithms." *Makara Journal of Technology*, Vol 22, No 2 (2018), pp. 60-65. DOI: 10.7454/mst.v22i2.3351.
5. Surjandari, I., Wayasti, R.A., **Laoh, E.**, Zulkarnain, Rus, A.M.M., Prawiradinata, I. "Mining public opinion on ride-hailing service providers using aspect-based sentiment analysis." *International Journal of Technology*, Vol 10, No 4 (2019) pages: 818-828. DOI: 10.14716/ijtech.v10i4.2860.

### Conference Papers

1. Syaputra, A., **Laoh, E.**, "Customer Segmentation on Returned Product Customers Using Time Series Clustering Analysis." *International Conference on ICT for Smart Society (ICISS) 2020*, DOI: 10.1109/ICISS50791.2020.9307575
2. Rahmadiani, R., Dhini, A., **Laoh, E.**, "Estimating customer lifetime value using LRFM model in pharmaceutical and medical device distribution company." *International Conference on ICT for Smart Society (ICISS) 2020*, DOI: 10.1109/ICISS50791.2020.9307592
3. Ramadhani, S., Dhini, A., **Laoh, E.**, "Airline Passenger Forecasting using ARIMA and Artificial Neural Networks Approaches." *International Conference on ICT for Smart Society (ICISS) 2020*, DOI: 10.1109/ICISS50791.2020.9307571
4. Amira, R.F., Surjandari, I., **Laoh, E.**, "Jakarta Flood Risk Mapping Using Index-based Approach and Spatial Analysis." *International Conference on ICT for Smart Society (ICISS) 2020*, DOI: 10.1109/ICISS50791.2020.9307583

5. Dhini, A., Budiani, L.R., **Laoh, E.**, "Segmenting and Targeting the Potential Markets of a Muslim Fashion Company." International Conference on ICT for Smart Society (ICISS) 2020, DOI: 10.1109/ICISS50791.2020.9307604
6. Ilham, M.Y., Surjandari, I., **Laoh, E.**, "Analyzing highway road accident characteristic using data mining." International Workshop on Big Data and Information Security, IWBS 2020, DOI: 10.1109/IWBS50925.2020.9255655.
7. Nur Prasasti, I.M., Dhini, A., **Laoh, E.**, "Automobile Insurance Fraud Detection using Supervised Classifiers." International Workshop on Big Data and Information Security, IWBS 2020, DOI: 10.1109/IWBS50925.2020.9255563.
8. Hidayattullah, S., Surjandari, I., **Laoh, E.**, "Financial statement fraud detection in Indonesia listed companies using machine learning based on meta-heuristic optimization." International Workshop on Big Data and Information Security, IWBS 2020, DOI: 10.1109/IWBS50925.2020.9255426.
9. Nadinta, D.S., Surjandari, I., **Laoh, E.**, "A clustering-based approach for reorganizing bus route on bus rapid transit system." Proceeding of 16th International Conference on Service Systems and Service Management, ICSSSM, Shenzhen: 2019, DOI: 10.1109/ICSSSM.2019.8887689.
10. Pramono, P.P., Surjandari, I., **Laoh, E.**, "Estimating customer segmentation based on customer lifetime value using two-stage clustering method." Proceeding of 16th International Conference on Service Systems and Service Management, ICSSSM, Shenzhen: 2019, DOI: 10.1109/ICSSSM.2019.8887704.
11. Prabaningtyas, N.I., Surjandari, I., **Laoh, E.**, "Mining customers opinion on services and applications of mobile payment companies in Indonesia using sentiment analysis approach." Proceeding of 16th International Conference on Service Systems and Service Management, ICSSSM, Shenzhen: 2019, DOI: 10.1109/ICSSSM.2019.8887643.
12. **Laoh, E.**, Surjandari, I., Febirautami, L. R. "Indonesian's Song Lyrics Topic Modelling using Latent Dirichlet Allocation." Proceeding of 5th International Conference on Information Science and Control Engineering, Zhengzhou: 2018, pp. 270-274. DOI: 10.1109/ICISCE.2018.00064.
13. Febirautami, L. R., Surjandari, I., **Laoh, E.** "Determining Characteristics of Popular Local Songs in Indonesia's Music Market." Proceeding of 5th International Conference on Information Science and Control Engineering, Zhengzhou: 2018, pp. 197-201. DOI: 10.1109/ICISCE.2018.00050.
14. Azitha, R., Surjandari, I., **Laoh, E.** "Mining Information Search Pattern on Website: A case study of educational institution." Proceeding of 5th International Conference on Information Science and Control Engineering, Zhengzhou: 2018, pp. 326-330. DOI: 10.1109/ICISCE.2018.00075.
15. Surjandari, I., Rosyidah, A., Zulkarnain, **Laoh, E.** "Mining Web Log Data for News Topic Modeling Using Latent Dirichlet Allocation." Proceeding of 5th International Conference on Information Science and Control Engineering, Zhengzhou: 2018, pp. 331-335. DOI: 10.1109/ICISCE.2018.00076.
16. **Laoh, E.** Surjandari, I., Zulkarnain, "Reconfiguring oil distribution route using graph partitioning and graph optimization," 2017 IEEE 8th International Conference on Awareness Science and Technology (iCAST), Taichung, Taiwan, 2017, pp. 103-108. DOI: 10.1109/ICAwST.2017.8256426.
17. Prameswari, P., Surjandari, I., **Laoh, E.** "Opinion mining from online reviews in Bali tourist area," 2017 3rd International Conference on Science in Information Technology (ICSITech), Bandung, 2017, pp. 226-230. DOI: 10.1109/ICSITech.2017.8257115.
18. Prameswari, P., Zulkarnain, Surjandari, I., **Laoh, E.** "Mining online reviews in Indonesia's priority tourist destinations using sentiment analysis and text summarization approach," 2017 IEEE 8th International Conference on Awareness Science and Technology (iCAST), Taichung, Taiwan, 2017, pp. 121-126. DOI: 10.1109/ICAwST.2017.8256429.
19. **Laoh, E.** Surjandari, I., Dhini, A. "Electricity distribution clustering and configuration study using KM-MST," 2017 3rd International Conference on Science in Information Technology (ICSITech), Bandung, 2017, pp. 138-143. DOI: 10.1109/ICSITech.2017.8257099.
20. Yuniarti, T., Surjandari, I., Muslim, E., **Laoh, E.** "Data mining approach for short term load forecasting by combining wavelet transform and group method of data handling (WGMDH)," 2017 3rd International Conference on Science in Information Technology (ICSITech), Bandung, 2017, pp. 53-58. DOI: 10.1109/ICSITech.2017.8257085.
21. **Laoh, E.**, Surjandari, I., Dhini, A. "Clustered Electricity Distribution Configuration Using KM-MST Algorithm." Proceeding of International Conference on Computer Science and Technology, Seoul: 2016.
22. Maharani, A., Surjandari, I., Rachman, A., **Laoh, E.** "Graph Theory Approach to Analyze Reliability Index of Gas and Steam Power Plant." Proceeding of International Conference on Computer Science and Technology, Seoul: 2016.

## Presentations

### Invited Talks

1. "Data Science and Its Applications." SPWI Seminar Series, Depok, April 2019.
2. "Data Mining with R." Data Mining Training SQE UI, Depok, September 2018.
3. "Factor Analysis (FA) and Principal Component Analysis (PCA) using R." FA and PCA Training SQE UI, Depok, September 2018.
4. "Demurrage Factor Analysis using Big Data Approach.", Industrial Engineering Student Seminar for Internship and Undergraduate Thesis Preparation, Depok, Indonesia, February 2017.
5. "Conducting Research using Structural Equation Modeling.", Statistics and Quality Engineering Student Training, Depok, Indonesia, March 2016.
6. "Dealing with Many Variables using Multivariate Analysis Method.", Statistics and Quality Engineering Student Training, Depok, Indonesia, March 2016.

### Conference Presentations

1. "Human-Centred Explainable Artificial Intelligent (XAI)." INFORMS Annual Meeting 2021, Anaheim, California, October 2021.
2. "Enhancing hospitality sentiment reviews analysis performance using SVM N-grams method." 16th International Conference on Service Systems and Service Management, Shenzhen, July 2019.
3. "Indonesian's Song Lyrics Topic Modelling using Latent Dirichlet Allocation." 5th IEEE International Conference on Information Science and Control Engineering, Zhengzhou, July 2018.
4. "Reconfiguring oil distribution route using graph partitioning and graph optimization.", IEEE 8th International Conference on Awareness Science and Technology, Taichung, Taiwan, November 2017.
5. "Neural network-based system for detecting and diagnosing faults in steam turbine of thermal power plant.", IEEE 8th International Conference on Awareness Science and Technology, Taichung, Taiwan, November 2017. "Electricity distribution clustering and configuration study using KM-MST", IEEE 3rd International Conference on Science and Technology, Bandung, Indonesia, October 2017.
6. "Data mining approach for short term load forecasting by combining wavelet transform and group method of data handling (WGMDH)", IEEE 3rd International Conference on Science and Technology, Bandung, Indonesia, October 2017.
7. "Opinion mining from online reviews in Bali tourist area", IEEE 3rd International Conference on Science and Technology, Bandung, Indonesia, October 2017.
8. "Clustered Electricity Distribution Configuration Using KM-MST Algorithm.", International Conference on Computer Science and Technology Workshop, Seoul, South Korea, November 2016.

## Teaching Experiences

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### University Teaching

I have teaching experience with the following courses at the university level:

- IEM 4913: Senior Design, Oklahoma State University
- IEM 3503: Engineering Economic Analysis, Oklahoma State University
- IEM 3513: Economic Decision Analysis, Oklahoma State University
- IEM 3813: Work Design, Ergonomics, and Human Performance
- ENGE600001: Calculus, Universitas Indonesia
- ENGE600002: Linear Algebra, Universitas Indonesia
- ENGE600011: Engineering Economics, Universitas Indonesia
- ENIE601002: Introduction to Economics, Universitas Indonesia
- ENIE601004: Probability Theory, Universitas Indonesia
- ENIE603006: Basic Statistics, Universitas Indonesia
- ENIE603007: Linear Programming, Universitas Indonesia
- ENIE604011: Industrial Statistics, Universitas Indonesia
- ENIE604015: Computational Method for IE, Universitas Indonesia
- ENIE604016: Operations Research, Universitas Indonesia
- ENIE606051: Decision, Uncertainty and Risk, Universitas Indonesia
- ENIE616027: Information System, Universitas Indonesia
- ENIE801006: Advance Statistics for IE, Universitas Indonesia
- ENIE802537: Decision Analysis and Risk Management, Universitas Indonesia

- ENIE803433: Multivariate Data Analysis, Universitas Indonesia
- ENGE600003: Fundamental of Physics, Universitas Indonesia
- ENGE600005: Statistics and Probabilistic, Universitas Indonesia

Course	Position	Semester	Instructor Rating	Class Type
IEM 4913	GTA	Spring 2023	n.a.	In-person
IEM 4913	GTA	Fall 2022	n.a.	In-person
IEM 3813	GTA	Fall 2022	n.a.	In-person & Lab
IEM 4913	GTA	Spring 2022	n.a.	In-person
IEM 4913	GTA	Fall 2021	n.a.	In-person
IEM 3503	GTA	Summer 2021	n.a.	Online
IEM 3513	GTA	Spring 2021	n.a.	In-person
ENGE600001	Instructor	Ganjil 2020	5.42 of 6.00	Regular
ENGE600001	Instructor	Ganjil 2019	5.18 of 6.00	Regular
ENGE600001	Instructor	Ganjil 2018	4.95 of 6.00	Regular
ENGE600002	Instructor	Genap 2020	5.20 of 6.00	Regular
ENGE600002	Instructor	SP 2019	5.53 of 6.00	Regular
ENGE600002	Instructor	Genap 2019	5.02 of 6.00	Regular
ENGE600002	Instructor	SP 2018	5.42 of 6.00	Regular
ENGE600011	Instructor	SP 2019	4.90 of 6.00	Regular
ENIE601002	Instructor	Ganjil 2020	5.73 of 6.00	Regular
ENIE601002	Instructor	Ganjil 2019	5.59 of 6.00	Regular
ENIE601002	Instructor	Ganjil 2018	5.40 of 6.00	Regular
ENIE601004	Instructor	Ganjil 2020	5.70 of 6.00	Regular
ENIE603006	Instructor	Ganjil 2020	5.55 of 6.00	Regular
ENIE603006	Instructor	Ganjil 2019	5.09 of 6.00	International
ENIE603006	Instructor	Ganjil 2018	5.46 of 6.00	International
ENIE603006	Instructor	Ganjil 2017	5.04 of 6.00	International
ENIE603007	Instructor	Ganjil 2019	5.04 of 6.00	International
ENIE604011	Instructor	Genap 2019	5.59 of 6.00	International
ENIE604011	Instructor	Genap 2018	5.29 of 6.00	International
ENIE604015	Instructor	Genap 2020	4.90 of 6.00	Regular
ENIE604015	Instructor	Genap 2018	5.29 of 6.00	International
ENIE604016	Instructor	Genap 2020	5.16 of 6.00	International
ENIE604016	Instructor	Genap 2018	5.31 of 6.00	Regular
ENIE606051	Instructor	Genap 2020	5.46 of 6.00	Regular
ENIE606051	Instructor	Genap 2019	5.59 of 6.00	International
ENIE606051	Instructor	Genap 2019	5.57 of 6.00	Regular
ENIE616027	Instructor	Genap 2020	5.56 of 6.00	International
ENIE616027	Instructor	Genap 2019	5.34 of 6.00	International
ENIE601002	GTA	Ganjil 2016	n.a.	Regular
ENIE603006	GTA	Ganjil 2016	n.a.	Regular
ENIE801006	GTA	Genap 2017	n.a.	Regular
ENIE802537	GTA	Genap 2017	n.a.	Regular
ENIE803433	GTA	Ganjil 2016	n.a.	Regular
ENGE600002	UTA	Genap 2015	n.a.	Regular
ENGE600003	UTA	Ganjil 2014	n.a.	Regular
ENGE600005	UTA	Genap 2014	n.a.	Regular

**Notes:** *GTA = Graduate Teaching Assistant    UTA = Undergraduate Teaching Assistant*  
*Ganjil = similar to Fall Term    Genap = similar to Spring Term    SP = similar to Summer Term    n.a. = not available*  
*Regular = class taught entirely in Indonesian    International = class taught entirely in English*

## Other Teaching

In addition to teaching at the university level, I have had the opportunity to teach in other capacities.

Course	Position	Grade Level	Institution	Dates
Physics	Course Instructor	12 <sup>th</sup> Grade	BTA Academy, Jakarta, ID	Jan 2014 - Dec 2020
Physics	Course Instructor	11 <sup>th</sup> Grade	BTA Academy, Jakarta, ID	Jan 2014 - Dec 2020
Physics	Course Instructor	10 <sup>th</sup> Grade	BTA Academy, Jakarta, ID	Jan 2014 - Dec 2020
Physics	Course Instructor	9 <sup>th</sup> Grade	BTA Academy, Jakarta, ID	Jan 2014 - Dec 2020
Physics	Book Author and Module Supervisor	10 <sup>th</sup> Grade	BTA Academy, Jakarta, ID	Jul 2017 - Jun 2020

## Industry Experiences

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**PT PJB Indonesia (Indonesia Power Generation Company)** 2020

*Asset management and performance health management framework and process detail design*

**PT PJB Indonesia (Indonesia Power Generation Company)** 2019, 2020

*Quality and Reliability Engineering Trainer*

**PT Pertamina (Indonesia Oil and Gas Company)** 2016

*Supply and Distribution Analyst Internship*

- Working as co-analyst for improving the distribution system
- Doing feasibility studies for new distribution location expansion

**PT Pertamina (Indonesia Oil and Gas Company)** 2015

*Student Research Program*

- Conducting a re-optimization distribution pattern research project

## Programming and Software Skills

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**Programming Languages:** R, Python, SQL, MatLab, Java

**Software:** IBM SPSS, Statistica, Rapid Miner, R Studio, Jupiter, ProModel, Minitab, Palisade Decision Tools, Ms Access, MySQL, Tableau, Supply Chain Guru

**Certification:** Certified Six Sigma Green Belt, Tableau Desktop Specialist (<https://www.credly.com/badges/81bf5494-2a61-4259-a33c-955eb27a8265>), Supply Chain Design (<https://scq.io/bIGf5pL>)

## Professional & Academic Society

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Institute for Operations Research and the Management Sciences (INFORMS)

Institute of Industrial and Systems Engineers (IISE)