

Valerie Y. Odeh Couvertier, MS

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Education

May 2024
(Expected)

Ph.D. candidate in Industrial & Systems Engineering
Research Focus Area: Health Systems Engineering
Statistics Minor
University of Wisconsin - Madison
Advisor: Dr. Gabriel Zayas-Cabán

July 2020

Master of Science in Industrial Engineering
University of Puerto Rico, Mayaguez
Advisor: Dr. Wandaliz Torres-García
GPA: **4.00/4.00**

May 2018

Bachelor of Science in Industrial Engineering
University of Puerto Rico, Mayaguez
Major GPA: **4.00/4.00** GPA: **3.82/4.00**, *Magna Cum Laude*

Research Experience

Evaluating Decision-Making in Healthcare

(August 2020 – Present): *UW Industrial & Systems Engineering – Dr. Zayas-Cabán*

- Developed a **causal inference framework** with specific application to learning health systems, for measuring the impact of intervening on a patient according to a constantly learning and updating **risk prediction algorithm**.
- Implemented advanced **causal inference** and **statistical methods** to estimate the direct impact of interventions, particularly those made in the ED, on specific outcomes of interest such as ED revisits, readmissions, and mortality.

Computational Modeling Using Multi-omics to Extract Early Predictive Signatures of T-cells Quality

(August 2018-July 2020): *Socially Responsible Operations Research Center (SRO) – Dr. Wandaliz Torres-García*

- Developed an integrative computational pipeline using **mathematical modeling** and **machine learning** techniques, including but not limited to **random forest**, **conditional inference forest**, **gradient boosted trees**, **support vector machine**, **clustering**, and **principal component analysis**, to characterize and assess the variability of CAR-T cell therapy manufacturing.
 - Designed a robust **multi-step semi-supervised algorithm** to address the challenge of highly correlated features, enabling identification of key driving variables in the CAR-T cell manufacturing process. Notably, it demonstrated a significant (>20%) improvement in stability for variable importance measures compared to traditional machine learning approaches.
 - Evaluated strategies to mitigate the impact of highly correlated variables and parameter tuning to the sensitivity of machine learning variable importance measures.
 - Collaborated and lead meetings with interdisciplinary team from Georgia Institute of Technology, University of Georgia, and University of Wisconsin-Madison.
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Industry Experience

Lens Case Assembly Capacity Analysis (Capstone Project)

(August 2017-February 2018): Techno Plastics Industries- Aguada, Puerto Rico

- Redesigned manufacturing area to improve product flow and eliminate WIP.
- **Reduced** WIP inventory by **98%** using one-piece flow configuration.
- Increased line production by **227%**.

Warehouse Layout Planning (Facilities Planning and Layout Project)

(January-June 2017): UPRM Supply Warehouse- Mayaguez, Puerto Rico

- Designed warehouse layout that **reduced** walking **distance** traveled by **68%**.
- Maximized space utilization by **50%**.

3D Printing Prototype Line Capacity Analysis (Work Measurement Project)

(January-May 2016): HP Inc.- Aguadilla, Puerto Rico

- Performed time studies and provided time standards for 3D printing prototype line.
- Applied line balancing and process standardization techniques that reduced cycle time by **39%**.

Engineering Co-op Student

(August-December 2015): Lilly del Caribe, Inc- Guayama, Puerto Rico

- Elaborated **warehouse space capacity tool** to track space utilization, shipments, and receipts.
- Assisted in the Material's warehouse decommissioning strategy due to cease of operations.
- Planned movements, shipments, and disposition of **70%** of the materials stored in the warehouse.

Manufacturing Engineering Intern

(June-August 2015): Hewlett-Packard- Aguadilla, Puerto Rico

- Conducted time studies and **line balancing** on production line to determine capacity and **resource utilization**.
- Improved ergonomic design of production lines and operator's tasks.
- Assigned department locations based on relationship priorities.
- **Achieved** an estimated **\$360,000 annual savings** in salaries and benefits by correctly establishing the number of employees needed to meet demand.

Ergonomic Evaluation and Assessment

(January-May 2015): Hewlett-Packard- Aguadilla, Puerto Rico

- Analyzed the manufacturing process through engineering tools (RULA, NIOSH) and reduced ergonomic risks by **50%**.
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Teaching Experience

Graduate Teaching Assistant

(Present): University of Wisconsin-Madison

Course: *ISyE 417 Health Systems Engineering*

Graduate Teaching Assistant

(August 2017-December 2018): University of Puerto Rico, Mayaguez

Course: *ININ 4040 Facilities Planning and Layout Laboratory*

- Developed and conducted laboratory class for 40+ students with the use of design software such as **SketchUp** and **AutoCAD**.
- Graded undergraduate student's laboratory reports and exams.
- Authored the Facilities Planning and Layout AutoCAD laboratory manual.

Mentoring Experience

CMaT REU Program Mentor

(June 2020): University of Puerto Rico, Mayaguez

- Mentored and facilitated the professional development of an undergraduate student from Georgia Tech in the area of data analytics and bioinformatics with application to research in CAR T-cell manufacturing.

CMaT RET Program Mentor

(June 2019): University of Puerto Rico, Mayaguez

- Mentored and facilitated the professional development of a high school teacher in the area of data analytics and bioinformatics with application to research in CAR T-cell manufacturing.

Mechanical and Industrial Engineering Mentoring Student

(August 2013-May 2014): University of Puerto Rico, Mayaguez

- Mentored and tutored 1st year undergraduate students to help them transition and adjust to the university lifestyle.
 - Participated in conducting the course UNIV 3005 (Introduction to University Life), mandatory for all undergraduate students.
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Research Publications

Valerie Y. Odeh-Couvertier, Brian W. Patterson, and Gabriel Zayas-Cabán. "Association Between Advanced Image Ordered in the Emergency Department on Subsequent Imaging for Abdominal Pain Patients." *Academic Emergency Medicine* 29, no. 9 (2022): 1078-1083.

Valerie Y. Odeh-Couvertier, Nathan J. Dwarshuis, Maxwell B. Colonna, Bruce L. Levine, Arthur S. Edison, Theresa Kotanchek, Krishnendu Roy, and Wandaliz Torres-Garcia. "Predicting T Cell Quality During Manufacturing Through an Artificial Intelligence-based Integrative Multi-Omics Analytical Platform." *Bioengineering & Translational Medicine* 7, no. 2 (2022): e10282.

Stephanie Marie Villanueva-Pérez, **Valerie Odeh-Couvertier**, Viviana Vázquez-García, Rocío Isabel Fernández Lafuente, Verónica Díaz Cruz, Zulma Acevedo Figueroa, Jomar Cintrón-Font et al. "Reintroducing Industrial Engineering Students to Manufacturing through Environmental Pertinence." *Científica* 25, no. 1 (2021): 1-7.

Research Publications Under Review

Valerie Odeh-Couvertier, Sebastian A. Alvarez-Avendano (co-first author), Brian W. Patterson, Manish N. Shah, and Gabriel Zayas-Cabán. "Outcomes from Admission rather than Discharge for Older adults in the Emergency Department with Vague Presentations"

Thesis

Valerie Odeh-Couvertier. Clustering highly correlated predictors to extract early predictive signatures of CAR-T cell quality. Diss. 2020.

Presentations at Conferences

Valerie Odeh-Couvertier (presenter), Kenneth Nieser, Brian W. Patterson, Gabriel Zayas-Cabán, and Amy Cochran. "Quasi-experimental designs for learning health systems". INFORMS Annual Meeting, Phoenix, AZ, October 16, 2023.

Valerie Odeh-Couvertier, Kenneth Nieser, Brian W. Patterson, Gabriel Zayas-Cabán, and Amy Cochran (presenter). "Quasi-experimental designs for learning health systems". American Causal Inference Conference, Austin, TX, May 2023.

Valerie Odeh-Couvertier (presenter), Brian W. Patterson, and Gabriel Zayas-Cabán. "Association Between Advanced Image Ordered in the Emergency Department on Subsequent Imaging for Abdominal Pain Patients." 31st Annual Wisconsin Emergency Medicine Research Forum, Madison, WI, March 2, 2023.

Valerie Odeh-Couvertier (presenter), Brian W. Patterson, and Gabriel Zayas-Cabán. "Association Between Advanced Image Ordered in the Emergency Department on Subsequent Imaging for Abdominal Pain Patients." INFORMS Annual Meeting, Indianapolis, IN, October 16, 2022.

Valerie Odeh-Couvertier (presenter), Sebastian A. Alvarez-Avendano, Brian W. Patterson, Manish N. Shah, and Gabriel Zayas-Cabán. "The Average Effect of Emergency Department Admission for Older Adults with Ambiguous Hospital Needs." INFORMS Annual Meeting, Indianapolis, IN, October 16, 2022.

Valerie Odeh-Couvertier (presenter), Nathan Dwarshuis, Maxwell Colonna, Danning Huang, Arthur Edison, Facundo Fernández, Krishnendu Roy, Theresa Kotancheck, and Wandaliz Torres. "CAR-T/T cell variability assessment and omics characterization through an integrative computational pipeline." CMat Annual Retreat, Atlanta, GA, February 27, 2020.

Valerie Odeh-Couvertier (presenter), Nathan Dwarshuis, Maxwell Colonna, Danning Huang, Arthur Edison, Facundo Fernández, Krishnendu Roy, Theresa Kotancheck, and Wandaliz Torres. "Computational Modeling Using Multi-omics to Extract Early Predictive Signatures of T-cells Quality." 2019 4th North American Industrial Engineering and Operations Management Conference, Toronto, ON, October 24, 2019.

Valerie Odeh-Couvertier (presenter), Nathan Dwarshuis, Maxwell Colonna, Danning Huang, Arthur Edison, Facundo Fernández, Krishnendu Roy, Theresa Kotancheck, and Wandaliz Torres. "Computational Modeling Using Multi-omics to Extract Early Predictive Signatures of T-cells Quality." 2019 Conference of Ford Fellows, San Juan, PR, October 4, 2019.

Valerie Odeh-Couvertier (presenter), Nathan Dwarshuis (presenter), Maxwell Colonna (presenter), Danning Huang, Arthur Edison, Facundo Fernández, Krishnendu Roy, Theresa Kotancheck, and Wandaliz Torres. "Assessment and Characterization of CAR T-cells." CMat Annual Retreat, Athens, GA, August 6-8, 2019.

Valerie Odeh-Couvertier (presenter), Nathan Dwarshuis, Maxwell Colonna, Danning Huang, Arthur Edison, Facundo Fernández, Krishnendu Roy, Theresa Kotancheck, and Wandaliz Torres. "Computational Modeling Using Multi-omics to Extract Early Predictive Signatures of T-cells Quality." CMat Annual Retreat, Athens, GA, August 6-8, 2019.

Valerie Odeh-Couvertier (presenter), Nathan Dwarshuis, Maxwell Colonna, Danning Huang, Arthur Edison, Facundo Fernández, Krishnendu Roy, Theresa Kotancheck, and Wandaliz Torres. "Computational Modeling Using Multi-omics to Extract Early Predictive Signatures of T-cells Quality." Quest University 2019, Río Grande, PR, June 1, 2019.

Valerie Odeh-Couvertier (presenter), Nathan Dwarshuis, Maxwell Colonna, Danning Huang, Arthur Edison, Facundo Fernández, Krishnendu Roy, Theresa Kotancheck, and Wandaliz Torres. "Computational Modeling Using Multi-omics to Extract Early Predictive Signatures of T-cells Quality." PR-LSAMP, University of Puerto Rico, Mayaguez, PR, May 4, 2019.

Valerie Odeh-Couvertier (presenter), Nathan Dwarshuis, Maxwell Colonna, Danning Huang, Arthur Edison, Facundo Fernández, Krishnendu Roy, Theresa Kotancheck, and Wandaliz Torres. "Computational Modeling Using Multi-omics to Extract Early Predictive Signatures of T-cells Quality." NIH RISE Symposium, University of Puerto Rico- School of Medicine, San Juan, PR, May 3, 2019.

Valerie Odeh-Couvertier (presenter), Nathan Dwarshuis, Maxwell Colonna, Danning Huang, Arthur Edison, Facundo Fernández, Krishnendu Roy, Theresa Kotancheck, and Wandaliz Torres. "Computational Modeling Using Multi-omics to Extract Early Predictive Signatures of T-cells Quality." XXIII Sigma Xi Poster Day, University of Puerto Rico, Mayaguez, PR, April 25, 2019.

Awards and Honors

- **Minority Issues Forum INFORMS Conference travel award** 2023
- **NextProf Nexus Workshop Alumni** 2023
- **Minority Issues Forum INFORMS Conference travel award** 2022
- **WIHSE Graduate Fellowship** 2021
- **Advanced Opportunity Fellowship (AOF): Graduate Engineering Research Scholars (GERS) Program** – University of Wisconsin – Madison 2020
- **IEOM Conference Graduate Poster Competition** – 2nd Place 2019
- **NSF Travel Award** – 4th North American IEOM Conference 2019
- **Frederick W. Taylor Award** – *Awarded to the best Industrial Engineering student* 2018
- **Juan A. Gorbea Award** – *Outstanding Industrial Engineering student* 2018
- **Industrial Engineering Honor Student Award** 2018
- **Alpha Pi Mu Honor Society** 2015
- **Golden Key Honor Society** 2014
- **Industrial Engineering Honor Student Award** 2013

Professional Activities and Service

- **INFORMS Annual Meeting (Session Chair)** 2022-2023
- **GERS Opportunities in Engineering Conference (Planning Committee)** 2021-2023
- **GERS Summer Undergraduate Research Experience (Planning Committee)** 2021-2023

Relevant Courses

Graduate: Design and Analysis of Quasi-Experiments for Causal Inference, Statistical Inference, Decision Trees for Multivariate Analysis, Simulation Modeling and Analysis, Stochastic Modeling Techniques, Introduction to Optimization, Sequencing and Scheduling of Resources, Knowledge Discovery in Engineering Multivariate Data, Quality Control Systems, Computing with R, Advanced Industrial Experimentation, Advanced Topics in Bioengineering, Advanced Production Control, Lean Six Sigma Methodology

Undergraduate: Probability and Statistics for Engineers, Applied Industrial Statistics, Engineering Economic Analysis, Industrial Safety, Computer-based Information Systems, Work Measurement, Systems Simulation with Digital Computers, Deterministic Models in Operations Research, Design and Analysis of Engineering Experiments, Work Systems Design, Facilities Layout and Design, Real Time Process Control, Statistical Quality Control, Accounting for Engineers, Cost Analysis and Control, Systems Production Inventory Management

Technical Skills

Knowledge in computer applications: R, Python, AutoCAD, FactoryCAD, MathCAD, SketchUp, MySQL, HTML, PHP, Simio, Arena, LaTeX, SAS, Julia, Gurobi, and MiniTab.

Languages: Proficient in English and Spanish.

Trainings and Certifications

Certifications:

- **Lean Six Sigma Yellow Belt Certified (SSYBC)TM**. (February 2015)

BioTalents supported by Amgen: Training in Biotechnology Manufacturing (October 2014)

- Training in the different components of a biomanufacturing process.

References

Dr. Gabriel Zayas-Cabán; Assistant Professor of Industrial & Systems Engineering; University of Wisconsin – Madison, Mechanical Engineering Building Room 3011; email: zayascaban@wisc.edu

Dr. Amy Cochran, Assistant Professor of Population Health Sciences and Mathematics; University of Wisconsin – Madison, 419 Van Vleck; email: cochran4@wisc.edu

Dr. Wandaliz Torres-García; Assistant Professor of Industrial Engineering; University of Puerto Rico – Mayaguez Room II-217B; email: wandaliz.torres@upr.edu