

Valerie Y. Odeh Couvertier, MS

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Objective

Highly skilled data scientist with a strong background in mathematical modeling, machine learning, and causal inference. Dedicated to developing advanced computational pipelines, designing innovative algorithms, and applying statistical methods to solve complex problems across industries. Committed to driving data-informed decision-making, optimizing processes, and delivering actionable insights for impactful business outcomes. Passionate about leveraging data science techniques to unlock patterns and drive innovation in any industry.

Education

Ph.D. Candidate | Industrial & Systems Engineering
Focus Area: Health Systems Engineering | Statistics Minor

University of Wisconsin Madison

Expected Graduation: **May 2024**

Master of Science | Industrial Engineering

University of Puerto Rico Mayaguez

Graduation Date: July 2020

GPA: **4.00/4.00**

Bachelor of Science | Industrial Engineering

University of Puerto Rico Mayaguez

Graduation Date: December 2017

Major GPA: **4.00/4.00** GPA: **3.82/4.00**

Research Experience

University of Wisconsin, Madison – Graduate Research Assistant

August 2020 – Present

- 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 **machine learning methods** to estimate the direct impact of healthcare interventions on specific outcomes of interest such as revisits, readmissions, and mortality.

University of Puerto Rico, Mayaguez – Graduate Research Assistant

August 2018 – July 2020

- 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.
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Special Projects

Comparative Analysis of Mean Income Estimation Algorithms Using Data from Puerto Rico

August – December 2021

- Employed various machine learning tree-based algorithms combined with standard approaches such as **inverse probability weighing** and **missing value estimation** to estimate the mean household income in Puerto Rico.
- Recommended the random forest model for its efficiency and accurate results in the analysis of large datasets.

Leveraging Machine Learning to Predict Spotify Song Success: A Comprehensive Analysis

Jan-May 2018

- Developed and **fine-tuned** a meta-learner **classification model** using a combination of random forest and **logistic regression algorithms**, significantly outperforming other evaluated models and capable of predicting song success with high precision based on five critical music attributes: danceability, volume, energy, tempo, and duration.

Techno Plastic Industries Capstone Project, Añasco, PR

August 2017 – February 2018

- Redesigned manufacturing area by developing **simulation model** to improve product flow.
- Reduced WIP inventory by 98% and increased line production by 227% through one-piece flow configuration.

Work Experience

Lilly del Caribe, Inc- Guayama, PR – Warehouse Department Coop Student

August-December 2015

- Developed a warehouse capacity tool to track space utilization, shipments, and receipts.
- In charge of overseeing and implementing the Material's warehouse decommissioning strategy due to cease of operations. Scheduled movements, shipments, and disposition of 70% of the materials stored in the warehouse.

Hewlett-Packard, Aguadilla, PR – Engineering Intern

June – August 2015

- Conducted time studies and line balancing on manufacturing line to determine baseline capacity.
- Achieved an estimated \$360,000 annual savings in salaries and benefits by developing and accurate workforce capacity model.
- Assigned department locations by creating relationship priorities and distance matrix during HP Inc and HPE split.

Skills

- **Languages:** Proficient in English and Spanish
- **Computer applications/tools:** R, Python, Julia, Gurobi, SQL, Simio, Arena, SAS, Minitab, AutoCAD, LaTeX
- **Statistical Expertise:** supervised and unsupervised machine learning, causal inference in observational data, big data analytics, missing data methods, feature selection methods, optimization, design of experiments, quasi-experimental designs

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 Kotancheck, Krishnendu Roy, and Wandaliz Torres-García. "Predicting T Cell Quality During Manufacturing Through an Artificial Intelligence-based Integrative Multi-Omics Analytical Platform." *Bioengineering & Translational Medicine* 7, no. 2 (2022): e10282.

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

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 and In Progress

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"

Valerie Odeh-Couvertier, Kenneth Nieser, Brian W. Patterson, Gabriel Zayas-Cabán, and Amy Cochran. "Quasi-experimental designs for learning health systems"

Selected Presentations

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

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. Wandaliz Torres-García; Assistant Professor of Industrial Engineering; University of Puerto Rico – Mayaguez Room 216; email: wandaliz.torres@upr.edu

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