

# Rachel Bennett

PhD candidate

School of Industrial and Systems Engineering

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## Summary

My research focuses on the development and use of data mining and analytical models to guide decision making for real-world problems. I am particularly interested in settings where decisions are made based on imperfect and massive datasets, particularly in healthcare informatics.

## Research Interests

Machine learning, big data analytics, predictive modeling, healthcare and bioinformatics, high performance computing, interpretable machine learning.

## Experience

**Graduate Research Assistant** | August 2019 – Present

### *Scalable Multilevel Deep Neural Networks*

- Created a novel neural network algorithm that could be trained on extremely large datasets for up to a fifth of the time of conventional methods.
- Cleaned and prepared large and complex data from the CDC National Center for Health Statistics for analysis.

### *Predicting Follow up visits and Suboptimal care among Childhood Cancer Survivors*

- Collaborated with multidisciplinary team to create machine learning-based survival models to predict patient adherence to follow-up care.
- Created and applied novel fairness and interpretability techniques to the best performing models.

### *Interpretable Machine Learning Models for Predicting Cesarean Delivery in Class III Obese Cohorts*

- Built a variety of statistical and machine learning models to predict unplanned cesarean deliveries, allowing physicians to prepare for emergencies and improve patient outcomes.
- Designed and implemented data pipelines to preprocess and clean data for machine learning models.

### *Early Prediction of Preeclampsia Using Machine Learning Methods*

- Led research on the creation of novel neural network algorithms for preeclampsia prediction, improving predictive accuracy over standard models.
- Utilized Python and TensorFlow for data analysis, modeling, and visualization.

## Education

**Ph.D.** Industrial Engineering | University of Oklahoma | Expected Jul. 2025

**M.S.** Data Science and Analytics, *Magna Cum Laude* | University of Oklahoma | Aug. 2021

**B.S.** Math and Physics, *Summa Cum Laude* | University of Science and Arts of Oklahoma | Dec. 2015

**B.A.** History, *Summa Cum Laude* | University of Science and Arts of Oklahoma | Dec. 2015

## Skills

- Python
- SQL
- Java
- Machine Learning
- Artificial Intelligence (AI)
- High Performance Computing
- Data Science
- Deep Learning
- Keras
- PyTorch
- Large Language Models (LLMs)

## Leadership and Service

- INFORMS Student Chapter, OU
  - *Vice-President* (2023-2024)
  - *Secretary* (2024-present)
  - *Treasurer* (2022)
- Graduate Student Senate
  - External Affairs Committee, *Member* (2023-2024)
  - Human Diversity Committee, *Chair* (2020-2021)
- Graduate Student Community at Gallogly College of Engineering
  - *Co-Chair* (2022–present)
  - *Promotional Team Member* (2021–2022)
- Human Factors Undergraduate Poster Competition, *Judge* (May 1, 2024)
- Graduate College of Engineering Diversity, Equity, and Inclusion Council of Excellence, OU, *Member* (2020–2021)
- Data Science and Analytics Club, OU, *Member* (2019)

## Honors/Awards

- 3 Minute Thesis Finalist (2021, 2024)  
*University of Oklahoma.*
- Graduate Student Senate Travel Grant (2023)  
*Awarded by University of Oklahoma Graduate Student Senate.*
- Finalist of Student Poster Competition - Minority Issues Forum (2023)  
*INFORMS Annual Conference*
- Winner of Student Poster Competition (2022)  
*First Annual Oklahoma Conference for Statistical Innovation and Application in the Era of Data Science*
- Dave Bert Scholarship Recipient (2021)  
*Awarded by the Gallogly College of Engineering, University of Oklahoma.*
- Machine Learning and AI Symposium predict-a-thon Winner (2019)  
*Awarded by the University of Oklahoma Machine Learning and AI Symposium.*
- USAO Distinguished Graduate (2015)  
*Top ranked graduate in graduating class of Fall 2015 of University of Science and Arts of Oklahoma.*
- Outstanding Division Graduate in Math and Physics (2015)  
*Outstanding graduate in mathematics and outstanding graduate in physics in graduating class of Fall 2015 of University of Science and Arts of Oklahoma.*