

Rachel Bennett

Postdoctoral Researcher

Lewis Katz School of Medicine

Temple University

Email: rachel.bennett0001@temple.edu

Website: rachelb.github.io

Summary

My research focuses on scalable, interpretable, and fairness-aware machine learning models for healthcare decision-making, particularly in high-dimensional and imperfect real-world data. I am particularly interested in settings where decisions are made based on imperfect and massive datasets, particularly in healthcare informatics.

Research Interests

Interpretable and fair machine learning, Predictive modeling in healthcare analytics, Scalable deep learning and high-performance computing, Survival analysis and time-to-event modeling

Experience

Postdoctoral Research Assistant | July 2026 – Present

Lewis Katz School of Medicine, Temple University

Graduate Research Assistant | August 2019 – May 2026

Scalable Multilevel Deep Neural Networks

- Developed a novel multilevel neural network architecture achieving up to 5× faster training than conventional deep learning approaches on large-scale healthcare datasets.
- 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.
- Developed and evaluated fairness-aware survival modeling techniques, integrating interpretability constraints into high-performing machine learning 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 | May 2026

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

Programming & Systems

Python, R, Julia, SQL, Java, C++, High-Performance Computing (HPC)

Machine Learning & Analytics

Machine Learning, Data Mining, Deep Learning, Artificial Intelligence (AI), Interpretable Machine Learning, Fair Machine Learning

Frameworks & Tools

PyTorch, Keras, scikit-learn, pandas, NumPy, 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)
- Data Science and Analytics Club, OU, *Member* (2019)

Honors/Awards

- Dissertation Excellence Award (2026)
University of Oklahoma.
- 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.