Rachel Bennett

PhD candidate
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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 Dec. 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
- C++
- High Performance Computing
- Artificial Intelligence (AI)
- 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.