Johnna Berryhill
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Education

2019-2023
B.S. in Mathematics, Minor in Statistics
Honors
Arkansas State University
Relevant Course Material:

- Statistical Analysis
- Probability Theory
- Linear Regression and ANOVA
- R Programming
- Python Programming

2023-Current (2025 expected graduation)
M.S. in Statistics
Arkansas State University
Relevant Course Material:

- Advanced Biostatistics
- Advanced Probability Theory
- SAS Programming
- Machine Learning
- Multivariate Statistics
- Survival Analysis

Research Experience

2020-2023
Undergraduate Research Assistant
Arkansas Bioscience Institute
Arkansas State University
Dr. Sudeepa Bhattacharyya Lab

Description:

- Collaborated on various research projects in a dry lab setting.
- Worked extensively with diverse human data sources, including medical records, electronic health records, survey data, and insurance claims datasets.
- Proficiently analyzed data using a variety of tools, with a primary focus on R and Python. Additionally, utilized SAS and SQL as needed.
- Conducted statistical modeling and generated detailed reports to communicate findings effectively.

2023-Current
Graduate Research Assistant
Arkansas Bioscience Institute
Arkansas State University
Dr. Sudeepa Bhattacharyya Lab
Funded by NSF EPSCoR DART
Description:

- Continued research work in a dry lab environment, specializing in data analysis and interpretation.
- Managed and analyzed complex human data, including medical records, electronic health records, survey data, insurance claims datasets, and spatial data.
- Proficiently utilized programming languages such as R and Python, alongside SAS, SQL, and ArcGIS Pro for comprehensive data analysis and manipulation.
- Developed and implemented statistical models to derive meaningful insights from the data.
- Assumed a mentoring role, guiding and supporting new students in the lab, particularly those without prior statistical or programming experience.

May 2024-August 2024 (ongoing)
Summer Student Research Program Participant (SSRP)
National Center for Toxicological Research (NCTR), FDA
Dr. Wen Zou lab
Project: Identification of prescription opioid use (POU)-related cardiovascular risks and sex differences through big data analysis.
Description:

- Investigated cardiovascular risk factors specifically associated with female POU users.
- Analyzed the types of opioid therapies linked to a higher risk of cardiovascular disease (CVD) in women compared to men.
- Conduced POU-associated CVD data retrieval and analysis and identified sex-based differences using machine learning and data mining techniques.
- Utilized the FAERS (FDA Adverse Event Reporting System) database for data mining.
- Applied programming skills in Java and Python to manage and analyze large datasets.

2025 (Ongoing)
Master's Thesis
Description:

- Arkansas: Conducting a spatial analysis using Geographically Weighted Regression (GWR) on CRC screening, incidence, and late-stage diagnosis data. This study uses social determinants of health (SDoH), environmental, and built environmental factors as predictors to examine how these relationships with CRC screening and outcomes change across the state, aiming to identify communities at risk.
- Nationwide: Analyzing CRC incidence across the entire United States, incorporating demographic and behavioral factors to gain comprehensive insights. Utilizing spatial machine learning methods to enhance the analysis.

- Dashboard development: Creating a dashboard to effectively showcase the study's results, facilitating easy interpretation and communication of findings.

2023
Honors Senior Undergraduate Thesis
Description:

- Conducted an in-depth investigation into disease classification models, with a primary focus on evaluating their performance in predicting Multimorbidity as the disease outcome.
- Distinguished the research by examining two distinct approaches:
    - Utilized neighborhood-aggregated level Social Determinants of Health (SDOH) as predictors, a widely used and freely available dataset in the field.
    - Employed individual-level SDOH as predictors, which were obtained through the purchase of marketing research data and subsequently linked with hospital records data.
- Designed and executed comprehensive data analysis procedures to assess the effectiveness of the two predictor types in disease classification.
- Demonstrated a strong commitment to data quality and accuracy in the research process, particularly in handling the individually purchased SDOH data.
- This research contributes to a deeper understanding of the impact of SDOH data sources on disease classification model outcomes, shedding light on potential improvements in predictive accuracy and healthcare decision-making.

Publications

- Gomez, E., **Berryhill**, J., & Bhattacharyya, S. *Prevalence of Perinatal Substance Use in Northeast Arkansas*. Manuscript in preparation.
- **Berryhill**, J., Greer, M., & Bhattacharyya, S. *Comparative Analysis of Individual and Aggregated-Level Social Determinants of Health in Predictive Models for Multimorbidity Outcomes*. Manuscript in preparation.
- Ramirez-Aguilar, D., **Berryhill**, J., Laryea, J., Gan, J., & Bhattacharyya, S. *Colorectal Cancer in Arkansas, 2013-2020: An Epidemiological Review of Associated Health Disparities*. Manuscript in preparation.
- **Berryhill**, J., Huang, X., & Bhattacharyya, S. *A Geospatial Insight: Understanding the Socio-Behavioral and Environmental Drivers of CRC Screening in Arkansas*. Manuscript in preparation.

Presentations

YEAR	TYPE	LOCATION	TITLE	CONFERENCE NAME
2021	Oral	Jonesboro, Arkansas	**Identifying Major Depression Patient Subgroups Based on Neuropsychiatric Symptoms and Blood Markers**	Create @ A-State Annual Symposium
2021	Oral	Virtual	**Identifying Major Depression Patient Subgroups Based on Neuropsychiatric Symptoms and Blood Markers**	National Council on Undergraduate Research (NCUR) Annual Symposium
2022	Oral	Virtual	**Impact of Maternal Factors on Infant Mortality in Arkansas: Evidence from the Claims Database**	National Council on Undergraduate Research (NCUR) Annual Symposium
2022	Oral	Jonesboro, Arkansas	**Impact of Maternal Factors on Infant Mortality in Arkansas: Evidence from the Claims Database**	Create @ A-State Annual Symposium
2022	Poster	Boston, Massachusetts	**Impact of Maternal Factors on Infant Mortality in Arkansas: Evidence from the Claims Database**	American Public Health Association (APHA) Annual Meeting
2022	Poster	Little Rock, Arkansas	**Impact of Maternal Factors on Infant Mortality in Arkansas: Evidence from the Claims Database**	Arkansas Summer Undergraduate Research Symposium (ASURS) Annual Symposium
2023	Oral	Jonesboro, Arkansas	**Individual Level Social Determinants of Health and Multimorbidity Severity Prediction**	Create @ A-State Annual Symposium
2023	Oral	Little Rock, Arkansas	**Harnessing Big Data: Revealing Hidden Disparities in Colorectal Cancer**	OAK Supercomputing Conference
2023	Oral	Atlanta, Georgia	**Harnessing Big Data: Revealing Hidden Disparities in Colorectal Cancer**	American Public Health Association (APHA) Annual Meeting
2023	Oral	Jonesboro, Arkansas	**Individual Level Social Determinants of Health and Multimorbidity Severity Prediction**	Undergraduate Thesis Defense
2023	Oral	Jonesboro, Arkansas	**Perinatal Substance Abuse in Northeast Arkansas**	St. Bernard's Medical Center
2023	Poster	Little Rock, Arkansas	**Addressing Underreporting Bias in Neonatal Drug Screening Rates**	Arkansas Bioinformatics Consortium (AR-BIC) Annual Consortium
2023	Poster	Springdale, Arkansas	**Individual Level Social Determinants of Health and Multimorbidity Severity Prediction**	NSF EPSCoR DART Annual Conference
2023	Poster	Little Rock, Arkansas	**Harnessing Big Data: Revealing Hidden Disparities in Colorectal Cancer**	OAK Supercomputing Conference
2024	Poster	Little Rock, Arkansas	**Spatial Modeling Highlights Risk Factors of Colorectal Cancer Screening Rates and Outcomes in Arkansas**	Arkansas Bioinformatics Consortium (AR-BIC) Annual Consortium

2024	Poster	Jonesboro, Arkansas	**Spatial Modeling Highlights Risk Factors of Colorectal Cancer Screening, Incidence, and Late-Stage Diagnosis in Arkansas**	Create @ A-State Annual Symposium

Other Achievements

2023

- Participated in the University of South Carolina National Big Data Health Science Student Case Competition, a 24-hour big data analytics competition (virtual). Gained valuable experience in analyzing and interpreting health-related big data.
- Received training and a certificate in Introduction to Deep Learning offered by NVDIA.

2024

- Led a workshop titled 'Introduction to R' at an R Programming Bootcamp hosted by UandI-DEECoDE, an NSF-funded research traineeship program at Arkansas State University. Shared expertise in R programming and data analysis with fellow students.
- Participated in the University of South Carolina National Big Data Health Science Student Case Competition, a 24-hour big data analytics competition (virtual). Demonstrated problem-solving skills in a competitive analytics environment.
- Acted as an abstract reviewer for the American Public Health Association annual meeting.

References

Sudeepa Bhattacharyya, PhD
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Department of Biological Sciences
Arkansas State University
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Relationship: Thesis Advisor and Research Supervisor

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Relationship: Statistics Professor and Thesis Committee Member