

KATHERINE BROWN

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EDUCATION AND TRAINING

Tennessee Technological University

August 2018 - July 2023

PhD in Engineering (Computer Science)

Dissertation Title: *Evaluating, Explaining, and Utilizing Model Uncertainty in High-Performing, Opaque Machine Learning Models*

Advisor: Dr. Doug Talbert

Tennessee Technological University

August 2018 - May 2021

Master's of Computer Science

Area of Emphasis: Artificial Intelligence

Cumulative GPA: 4.0/4.0

Advisor: Dr. Doug Talbert

Tennessee Technological University

August 2014 - May 2018

Bachelor's of Computer Science

Concentration: Data Science

Cumulative GPA: 3.96/4.0

Member of Kappa Mu Epsilon

Summa Cum Laude

SKILLS

Programming: Python, R, Java, C++, NoSQL, MySQL, PostgreSQL

Software & Tools: Scikit-Learn, Keras, PyTorch, Pandas, SciPy, Numpy, Git, Weka, Splunk, Splunk ITSI

PROFESSIONAL EXPERIENCE

Postdoctoral Research Fellow Trainee (NLM T15 Grant)

August 2023 - Present

Vanderbilt University Medical Center, Nashville, TN

- Funded through National Library of Medicine.
- Perform research in biomedical and clinical informatics.
- Develop computational solutions to research tasks.
- Write and present scholarly works.

Graduate Research Assistant (Machine Learning Research Consulting)

August 2022 - May 2023

Tennessee Technological University, Cookeville, TN

- Developed and piloted a research consulting service for Tennessee Technological University.
- Includes one-on-one consultation appointments with researchers from multiple engineering and science disciplines, development of machine learning resources, and delivery of informative seminars.

PhD Student Research Mentor

August 2022 - July 2023

Tennessee Technological University, Cookeville, TN

- Mentor to an undergraduate research team performing research on computerized trauma triage.
- Cleaned and processed the National Trauma Data Bank for machine learning use.
- Helped supervise development of machine learning tools.

Graduate Teaching Assistant

August 2021 - May 2022

Tennessee Technological University, Cookeville, TN

- Instructor of record for a sophomore undergraduate course on algorithm analysis and algorithm design techniques.
- Delivered lectures, prepared and graded written and programming assignments and exams.

Graduate Research Assistant

August 2018 - May 2021

Tennessee Technological University, Cookeville, TN

- Design experiments in the areas of Artificial Intelligence, Machine Learning, and Healthcare Informatics.
- Develop computational solutions to research tasks.
- Write and present scholarly works.

Adjunct Instructor

Summer 2019 & 2020

Tennessee Technological University, Cookeville, TN

- Taught sophomore-level introduction to theoretical computer science course during a full-term summer semester.
- Developed and administered an online, undergraduate algorithms course
- Course introduces sophomore undergraduates to algorithm analysis and algorithm design techniques.
- Recorded lectures, prepared and graded written and programming assignments and exams.

Undergraduate Research Assistant

March 2016 - May 2018

Tennessee Technological University, Cookeville, TN

- Conducted research in machine learning and healthcare informatics.
- Co-authored scholarly works.
- Programmed solutions to various research problems.

Research Intern

June 2017 - August 2017

Oak Ridge National Laboratory, Oak Ridge, TN

- Participant in the Higher Education Research Experience (HERE) Program within the Biomedical Computing Division.
- Developed a bioinformatics machine learning application with Python and Sci-Kit Learn

Undergraduate Teaching Assistant

August 2015 - December 2016

Tennessee Technological University, Cookeville, TN

- Evaluated quizzes, exams, and assignments in various Computer Science courses.
- Tutored students.
- Assisted in designing and administering laboratories.

PUBLICATIONS AND PRESENTATIONS

In-Progress (To be submitted within 6 months)

1. **Brown KE**, ..., Ancker JS. “Fairness of AI Collaboration and Suppression in Emergency Triage.” Planned Submission to *Journal of the American Medical Informatics Association*.
2. **Brown KE**, ..., Davis SE. “Gaps in Health Artificial Intelligence Research in the Rural United States.” Planned Submission to *Journal of the American Medical Informatics Association*.

Currently Under Review

1. **Brown KE**, Malin BA, Davis SE. “Performance of Clinical Prediction Models in Rural Healthcare Centers.” Submitted to AMIA Annual Symposium 2025.
2. Jackson NJ, **Brown KE**, Cauley MR, Collins BX, Novak LL, Ancker JS. “Factors Influence Trust and Reliance on AI for Medical Decision-Making: A Rapid Review”. Currently Under Review.

Journal and Conference Publications

1. **Brown KE**, Yan C, Li Z, Zhang X, Collins BX, Chen Y, Clayton EW, Kantarcioglu M, Vorobeychik Y, Malin BA. “Large Language Models are Less Effective at Clinical Prediction Tasks than Locally Trained Machine Learning Models.” Accepted for publication at *Journal of the American Medical Informatics Association*.
2. **Brown KE**, Talbert S, Talbert DA. “Derivation and Experimental Performance of Standard and Novel Uncertainty Calibration Techniques.” *Proceedings of the American Medical Informatics Association Annual Symposium*, 2024.
3. Talbert DA, Phillips KL, **Brown KE**, Talbert S. “Assessing and Addressing Model Trustworthiness Trade-offs in Trauma Triage.” *International Journal on Artificial Intelligence Tools*. 2024 May 25;33(03):2460007.
4. **Brown KE**, Talbert S, Talbert DA. “A QUEST for Model Assessment: Identifying Difficult Subgroups via Epistemic Uncertainty Quantification.” *Proceedings of the American Medical Informatics Association Annual Symposium*, 2023.
5. Phillips KL, **Brown KE**, Talbert S, Talbert DA. “Group Bias and the Complexity/Accuracy Tradeoff in Machine Learning-Based Trauma Triage Models.” *Proceedings of the Florida Artificial Intelligence Research Society (FLAIRS-36)*, 2023.

6. Gannod M, Masto N, Owusu C, Highway C, **Brown KE**, Blake-Bradshaw A, Feddersen JC, Hagy HM, Talbert DA, Cohen B. “Semantic Segmentation with Multispectral Satellite Images of Waterfowl Habitat.” *Proceedings of the Florida Artificial Intelligence Research Society (FLAIRS-36)*, 2023.
7. **Brown KE**, Talbert DA. “A Simple, Direct Uncertainty Quantification Technique Based on Machine Learning Regression”. *Proceedings of the Florida Artificial Intelligence Research Society (FLAIRS-35)*, 2022.
8. **Brown KE**, Talbert DA. “Using Explainable AI to Measure Feature Contribution to Uncertainty”. *Proceedings of the Florida Artificial Intelligence Research Society (FLAIRS-35)*, 2022.
9. **Brown KE**, Talbert DA. “The Uncertainty of Counterfactuals”. *Proceedings of the Florida Artificial Intelligence Research Society (FLAIRS-34)*, 2021.
10. **Brown KE**, Bhuiyan F, Talbert DA. “Uncertainty Quantification in Multimodal Ensembles of Deep Learners”. *Proceedings of the Florida Artificial Intelligence Research Society (FLAIRS-33)*, 2020. (**Winner: Best Student Paper Award**)
11. Bhuiyan F, **Brown KE**, Sharif B, Johnson Q, Talbert DA. “Assessing Modality Selection Heuristics to Improve Multimodal Machine Learning for Malware Detection”. *Proceedings of the Florida Artificial Intelligence Research Society (FLAIRS-33)*, 2020.
12. **Brown KE**, Talbert DA. “Heuristically Reducing the Cost of Correlation-Based Feature Selection”. *Proceedings of the Association of Computing Machinery Southeast Conference*, 2019. (**Runner-Up: Best Paper Award**)

Invited Talks

1. **Brown KE**. “Large Language Models in Medicine: Perils and Promise.” Vanderbilt University Department of Biomedical Informatics. December 2, 2024.
2. **Brown KE**. “A QUEST for Model Assessment: Uncertainty Quantification and Hidden Stratification” Vanderbilt University Department of Biomedical Informatics. October 30, 2023.
3. Talbert DA, **Brown KE**. “Explainability and Medical AI.” Vanderbilt University Department of Biomedical Informatics. January 13, 2022.

Abstracts and Poster Demonstrations

1. **Brown KE**, Yan C, Li Z, Zhang X, Collins BX, Chen Y, Clayton EW, Kantarcioglu M, Vorobeychik Y, Malin BA. “Not the Models You Are Looking For: An Evaluation of Performance, Privacy, and Fairness of LLMs in EHR Tasks.” To appear in *Proceedings of the American Medical Informatics Association Informatics Summit*, 2025.
2. Dziorny A, Pinto N, Lindell R, **Brown KE**, Park A, Sezgin E, DeSerisy M. “Low Prevalence of New Mental Health Visits following PICU Admission: A Multi-Institution Study.” To appear in *Proceedings of the 2025 Critical Care Conference*, 2025.
3. **Brown KE**, Cauley MR, Collins BX, Jackson N, Malin BA, Ancker JS. “Fairness of AI Collaboration and Suppression in Emergency Triage.” *Proceedings of the American Medical Informatics Association Annual Symposium*, 2024.
4. **Brown KE**, Talbert S, Talbert DA. “Assessing the Quality of Uncertainty Calibration.” *Proceedings of the American Medical Informatics Association Annual Symposium*, 2023.
5. **Brown KE**, Talbert DA. “Estimating Uncertainty in Deep Image Classification.” *Proceedings of the American Medical Informatics Association Annual Symposium*, 2019.
6. **Brown KE**, Talbert DA. “Multi-Task Correlation-Based Feature Selection for Gene Expression Data.” *Proceedings of the American Medical Informatics Association Annual Symposium*, 2018.

Panels and Workshops

1. Ancker JS, Jackson NJ, **Brown KE**, Benda NC. “Trust in AI: What do we mean by trust and how should we measure it?” Workshop accepted for presentation at *Medical Informatics Europe 2025*, 2025.
2. Collins BX, **Brown KE**, Papier A, Lester JC. “Skin Color and Tone as Biomedical and Social Determinants of Health Data.” *Proceedings of the American Medical Informatics Association Annual Symposium*, 2024.

HONORS AND AWARDS

- **Star Research Award:** Society of Critical Care Medicine 2025 Critical Care Congress (Co-authored abstract), March 2025
- **Participant:** Biomedical Data Science Innovation Lab, June 2024
- **Reviewer Award:** AMIA Informatics Summit 2024, March 2024.
- **Best Student Paper Award:** Florida Artificial Intelligence Research Symposium, May 2020.
- **Runner-up Best Paper Award:** Association of Computing Machinery 2019 Southeast Conference, April 2019
- **Research and Creative Inquiry Award Winner (TIE):** Tennessee Technological University, April 2019
- **Research and Creative Inquiry Award Winner:** Tennessee Technological University, April 2018
- **Engineering, Computing, and Technology Spectrum Award:** Tennessee Technological University College of Engineering, February 2018

LEADERSHIP AND SERVICE

- Editorial Board – Member** *January 2025 - December 2027*
Journal of the American Medical Informatics Association
- Reviewed submitted articles for the *Journal of the American Medical Informatics Associates*
- National Library of Medicine Biomedical Informatics and Data Science Training Program (T15) Conference – Organizing Committee Member** *November 2024 – January 2025*
- Vanderbilt-Ingram Cancer Center 26th Annual Scientific Symposium Co-Chair** *October 2024 – April 2025*
- American Medical Informatics Association – Scientific Program Committee Member** *April 2024*
- Vanderbilt University Medical Center – Department Service** *April 2024 – Present*
- Outstanding Educator Committee – Member (April 2024).
- Florida Artificial Intelligence Research Society – Track Co-Chair (Artificial Intelligence in Health Informatics Special Track)** *January 2024 – Present*
Tennessee Technological University, Cookeville, TN
- Organize and perform peer review of papers submitted to the Artificial Intelligence in Health Informatics Special Track of the FLAIRS annual conference.
- College of Engineering Graduate Studies Executive Committee – Graduate Student Representative** *August 2022 - May 2023*
Tennessee Technological University, Cookeville, TN
- Represented engineering graduate students college-level policy and catalog revisions and updates.
- Student Editorial Board – Member** *January 2022 - December 2023*
Journal of the American Medical Informatics Association
- Reviewed submitted articles for the *Journal of the American Medical Informatics Associates* under the mentorship of the associate editors of the journal.
 - Moderated two *JAMIA* Journal Club Seminars for year 2023.
- Data Science League — Co-founder and Student Officer** *September 2018 - May 2022*
Tennessee Technological University, Cookeville, TN
- President (January 2018 - August 2018; August 2020 - May 2022)
 - Vice President (August 2018 - August 2020)
 - Co-Founder and Charter Member

Computer Science Graduate Student Club — Officer*September 2019 - September 2021**Tennessee Technological University, Cookeville, TN*

- Vice President (August 2020 - September 2021) Managed meeting logistics and served as acting president and moderator when necessary
- Treasurer (September 2019 - May 2020) Managed funds and procured university funding for the Computer Science Graduate Student Club

Department of Computer Science Student Advisory Council — Member*September 2018 - September 2021**Tennessee Technological University, Cookeville, TN*

- Represented graduate and data science students in department-wide administrative meetings.

Tennessee Tech ACM-W Chapter — Student Officer*August 2015 - May 2019**Tennessee Technological University, Cookeville, TN*

- Student Mentor (August 2018 - May 2019): Served as a mentor to newly elected officers.
- President (August 2016 - May 2018): Administered local chapter including organizing and conducting meetings
- Vice President (August 2015 - May 2016): Managed meeting logistics and served as acting president when necessary