Frank Hodges

PhD Student in AI/ML

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Education

2024–Present	**Ph.D. in Artificial Intelligence**, *Oregon State University*, Corvallis, OR, 3.79
	Advisor: Dr. Stephen Ramsey (expected 2027).
	M.S. in Computer Science (concurrent)
2023–2024	**B.S. in Computer Science**, *Oregon State University*, Corvallis, OR, 3.81
2017–2020	**B.A. in Biology**, *The Ohio State University*, Columbus, OH, 3.12

Relevant Experience

2024–Present Graduate Research Assistant — Ramsey Lab, *Oregon State University*, Corvallis, OR

- Conducting research at the intersection of artificial intelligence, biomedical informatics, and computational biology, with a focus on applying machine learning to rare disease discovery and knowledge representation.
- Designing and developing large-scale AI systems for biomedical knowledge extraction, graph-based reasoning, and retrieval-augmented decision support.
- Building and maintaining high-performance data pipelines for ingestion, text segmentation, and semantic embedding of biomedical literature across multiple research projects.
- Supporting the development and integration of knowledge graph models and agentic retrieval frameworks used across the Ramsey Lab's AI research portfolio.
- Collaborating with interdisciplinary teams to evaluate model performance, interpretability, and clinical applicability for diverse biomedical domains.

2023–2024 Project Assistant — Ramsey Lab, *Oregon State University*, Corvallis, OR

- Supported the development of computational frameworks for biomedical knowledge discovery and AI-driven hypothesis generation in rare disease research.
- Assisted in the design and implementation of large-scale data processing and document ingestion pipelines for integrating structured and unstructured biomedical information.
- Contributed to early-stage system architecture, evaluation, and documentation efforts for machine learning–based retrieval and reasoning tools used across multiple lab projects.
- Collaborated with graduate researchers to benchmark model performance, identify bottlenecks in data workflows, and improve reproducibility in experimental pipelines.

Research Projects

Radiant:	Designed and implemented a retrieval-augmented generation (RAG) pipeline, integrating a knowledge graph and vector store for rare disease diagnosis and treatment discovery. Refactored the pipeline for modular agent coordination and integrated a POMDP-based policy framework for decision optimization.
Translator:	RTX-KG2: A large biomedical knowledge graph maintained by the Ramsey Lab. I assist in maintaining, debugging, and improving the knowledge ingestion and reasoning pipelines.
Query-Graph Extraction:	Developed a natural language–to–graph query translator that maps biomedical questions into structured graph representations using SciSpacy and rule-based relation extraction. Implemented ontology alignment across MeSH, UMLS, and custom schema for cross-domain biomedical reasoning.

Node Embed:	Created an embedding pipeline using node2vec and transformer-based contextual encoders to generate semantic embeddings for biomedical entities. Tuned similarity metrics and evaluated link prediction for disease–gene and drug–target associations.
Stroke Prediction:	Built and evaluated a machine learning pipeline for stroke prediction on a highly imbalanced clinical dataset. Applied preprocessing techniques including SMOTE, PCA, and multiple imputation. Achieved a recall of 0.835 and ROC AUC of 0.8279 with Random Forest, outperforming a dummy baseline (0.000 recall, 0.500 ROC AUC).

Other Experience

2014–2020	**Ohio Army National Guard – Health Care Specialist/Combat Medic (68W)**
2020–2021	**Cleveland Clinic – Medical Assistant**
2021–2023	**FEMA – Contract EMT**

Leadership/Service/Teaching

2024–Present Co-President – AI Graduate Student Association (AIGSA)
- Lead strategic planning initiatives, organize technical workshops and speaker events, and advocate for graduate student interests in artificial intelligence research and education.

2024–Present Graduate Council Member – Faculty Senate
- Serve on the Graduate Council to review graduate program proposals, shape curriculum standards, and contribute to university-wide academic policy decisions.

2024–Present Union Steward – Coalition of Graduate Employees (CGE)
- Represent graduate employees in contract negotiations and workplace concerns, facilitate communication between union leadership and department members, and uphold labor protections.

2023–2024 Teaching Assistant – Data Structures & Computer Architecture/Assembly Language
- Instructed students through office hours, discussion sessions, and individual feedback; supported learning in algorithmic complexity, memory hierarchy, instruction sets, and low-level programming. Graded assignments and exams for 100+ students.

Publications

F.M. Hodges, et al., "Using AI to Improve Diagnosis and Treatment of Rare Diseases: A Chat Agent for Equitable and Accessible Healthcare," *Artificial Intelligence in Medicine (AIME)*, LNCS vol. 15735, Springer, 2025. doi:10.1007/978-3-031-95841-0_35

F.M. Hodges, et al., White Paper on Radiant, Oregon State University, 2025. radiant.rtx.ai/whitepaper

Presentations

Poster Presentation	*Radiant: An Agentic RAG System for Rare Diseases*. Presented at Artificial Intelligence in Medicine, Pavia, Italy 2025.
Demonstrative Presentation	*Radiant*. Presented at Stanford & Research to the People Rare Disease Hackathon, San Fransisco, California, 2024.

Technical Skills

Programming: Python, Haskell, Bash, SQL, LaTeX
Machine Learning: PyTorch, scikit-learn, HuggingFace, XGBoost, cvxpy
NLP / Retrieval: spaCy, BioLinkBERT, BM25, ChromaDB, RAG pipelines
Knowledge Graphs: Neo4j, RDF, GraphQL, Cypher
Cloud / HPC: Linux, Slurm, Docker, NVIDIA DGX, Git, VS Code
Research Focus: AI for Rare Diseases, Biomedical Knowledge Representation, Explainable AI