

Beth Pearson

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SUMMARY

I build evaluation methods and interpretability tools tailored to the subtle failure modes of Vision-Language Models, specifically focusing on compositional generalization, negation, and spatial reasoning. My work combines fundamental multi-modal AI research with practical engineering experience, ranging from production web app development to building applied NLP tools for medical professionals. I'm looking to apply my background in machine learning and software development to solve practical, real-world problems.

Languages: Python (Primary), BASH, PHP, MYSQL, MATLAB

Technologies: PyTorch, SKLearn, HuggingFace

Tools & Infrastructure: Git, Slurm / GPU Clusters, WandB, Linux

ACADEMIA

Interactive Artificial Intelligence, PhD Sep 2022 - Present

Department of Computer Science, University of Bristol

Thesis Title: Understanding Compositional Reasoning in Vision-Language Models

- Built workflows using PyTorch and HuggingFace to analyse Vision-Language Models (VLMs) such as PaliGemma, LLaVA, and InternVL, identifying specific failure modes in spatial reasoning, attribute binding, and negation.
- Designed novel evaluation benchmarks to systematically stress-test VLM reasoning capabilities beyond standard leaderboards.
- Managed distributed training and evaluation jobs across HPC / multi-GPU clusters

Engineering Mathematics, MEng (First Class Honors) Sep 2016 - Jun 2020

Department of Engineering Mathematics, University of Bristol

- **Final Year Project – Activity Recognition from LiDAR Sensing in Smart Homes:** Built ML models to classify human activities from raw point cloud data. Performed unsupervised segmentation on LiDAR sensor data, comparing the performance of different neural networks on correctly identifying human activities such as walking and sitting.
- **Selected Modules:** Intelligent Information Systems, Bio-Inspired AI, Robotic Systems, Systems Security, Dynamics of Networks, Information Processing and the Brain.

PROFESSIONAL EXPERIENCE

AI Research Intern Sep 2025 – Nov 2025

Rosenfield Health Tech Ltd, Cardiff, United Kingdom

- Developed a privacy-first NLP pipeline in **Python** using **sciSpacy** for clinical Named Entity Recognition and local LLMs (**Llama**, **Mistral**) to evaluate differences between junior and senior radiology reports.

- Collaborated with radiologists and researchers to engineer a proof-of-concept MVP, ensuring efficient, on-premise inference that kept sensitive patient data secure without external cloud APIs.

Software Developer Jun 2020 – Jul 2022

Wilxite, Stroud, United Kingdom

- Developed and maintained internal web applications in **PHP** to streamline company business operations, data management, and automated invoicing.
- Designed **MySQL** database queries to store and manage operational business records accurately.
- Collaborated with non-technical users to translate real-world business requirements into clean, maintainable code.

SELECTED PUBLICATIONS

[1] Beth Pearson, Bilal Boulbarss, Michael Wray, and Martha Lewis. 2025. [Evaluating Compositional Generalisation in VLMs and Diffusion Models](#). In *Proceedings of the 14th Joint Conference on Lexical and Computational Semantics (*SEM 2025)*, pages 122–133, Suzhou, China. Association for Computational Linguistics.

[2] Pearson, B., Adnan, A., Abdallah, Z.S. (2026). Semantic Similarity in Radiology Reports via LLMs and NER. In: Tommasino, C., Russo, C., Bernardini, M. (eds) *Artificial Intelligence for Biomedical Data. AIBIO 2025. Communications in Computer and Information Science*, vol 2696. Springer, Cham. https://doi.org/10.1007/978-3-032-17216-7_10

Teaching & Academic Service

- **Teaching Assistant:** Supported undergraduate Computer Science and Mathematics modules, including supervising student projects for Intro to AI.
- **Peer Reviewer:** Reviewed conference and journal papers for ACL Rolling Review and IET.
- **Presentations:** Presented research at international conferences and departmental seminars.

Additional Information

- **Driving License:** Full UK Driver's License
- **Interests:** Running, Rock Climbing, Playing Keyboard, Live Music